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The Outlook

Ministries, Corporations and Constructors

THAT the present situation in British civil aviation closely approximates to chaos is the theme of an article published in this issue. Our contributor lashes out with great impartiality at the Fred Carno set-up which governs our air transport affairs. While one cannot agree with everything he says, there is no denying the fact that all is not well with the civil aviation world.

There are too many fingers in the air transport pie, too many cooks spoiling the broth, too many tortuous channels to be negotiated before decisions are reached, and too many loopholes for excuses. The whole chaotic system as it has developed in practice, whatever may have been the original intention, makes one sigh for the time when the operator could go straight to the constructor, explain what we wanted, and then in close consultation during the design and manufacturing period come somewhere near getting what was wanted.

It is no use blaming the aircraft industry, at any rate where the larger aircraft types are concerned. It has become financially impossible for any firm to produce these as a private venture. But it should be possible to straighten-out some of the present tangled skeins. A fairly drastic reorganization may be needed. How can quick decisions be reached while the Corporations lay down their requirements, the Ministry of Civil Aviation gives its blessing and passes them on to the Ministry of Supply, tenders are submitted, meetings held with large numbers of representatives of all interested parties? And after long delays caused by modifications, by shortage of materials or by lack of manpower, the machine is at last finished, by which time the air traffic picture has changed and the operators discover that the aircraft is not now entirely suitable. There are endless opportunities for wrangling, and quite possibly the unfortunate manufacturer ultimately finds the order cancelled.

Legally it may be in order for the Corporations to have so much power; morally it is indefensible. No one would deny their rights to decline to take delivery of an aircraft which failed to give the performance promised, or which had really serious defects in its handling characteristics, but there have been too many excuses based upon trivial shortcomings. If that sort of thing is permitted to continue, a point will be reached when many a manufacturer will hesitate to tender. The result will be that the aircraft industry as a whole will be less and less capable of supplying the needs of the operators.

That is the present trend. If continued to its logical conclusion it will mean either buying foreign aircraft or the closing-down of British air transport, at any rate on the Empire and North Atlantic routes.

Enterprise

FROM the lack of co-operation and co-ordination it is pleasant to be able to turn to an example of how Government ownership and private enterprise can, in a more closely knit association, still produce a new aircraft type, almost, one might say, as a private venture, although that expression is scarcely applicable, at least in its original meaning, to a firm in which the Government owns something like 80 per cent of the shares.

We refer, of course, to the Short Sealand amphibian, which is described in this issue, and which is due to make its first flight in the very near future. Short Brothers and Harland, Ltd., as we recorded a few weeks ago, is the new name of the firm, but the design of the Sealand was initiated by Short Brothers at Rochester, taken over by the Government in the days when Sir Stafford Cripps was Minister of Aircraft Production. He

laid it down as a definite policy that, in spite of nationalization, the company was to stand or fall on its merits.

The directors have decided, and we believe the decision to be a wise one, to launch a small amphibian flying boat, not as a result of orders "straight off the drawing board," but because they feel that there is in the world a fair-sized market for a good modern amphibian.

Whenever the subject of amphibians is mentioned, there are always those who immediately advance against it the argument that the land undercarriage reduces the payload too greatly. In exactly the same way, landplane enthusiasts argue that the flying boat is more expensive to operate. What is too often overlooked is the fact that the amphibian caters for a different demand. If it fulfils that demand, and if the landplane or the flying boat cannot do so, then the argument about relative efficiencies no longer applies.

There are many districts in the world where the amphibian is the only type which will meet the requirements and where spectacular performance and very low operating costs are not of primary importance. Such places exist not only in parts of the British Commonwealth and Empire but in many other countries.

The Cross-country Route

SUCH is the layout of British railways and their time tables that it is quite often quicker to travel from one provincial town to another via London. On the Empire air routes there is at present no alternative to the equivalent of the vee-shaped route. People from Central and South Africa who wish to travel by air to India or Australia have no option but to fly to Egypt and thence along the existing routes. This means an increase in travel distance of many thousands of miles compared with the direct route across the Indian Ocean.

We are reminded by a letter to the *Sunday Times* that this route was surveyed in 1939 by P. G. Taylor, who reported favourably on it from the operational point of view.

In our issue of August 7th, 1939, we recorded some of his impressions. He was flying a Consolidated flying boat, *Guba*, and not only found that the islands at which he called (Cocos, Diego Garcia and the Seychelles) had natural flying-boat bases, but that sites for land airfields were better than he had expected. During the recent war, military airfields were established in the Cocos and Seychelle Islands, and it might be worth while reviewing the possibilities of a civil route.

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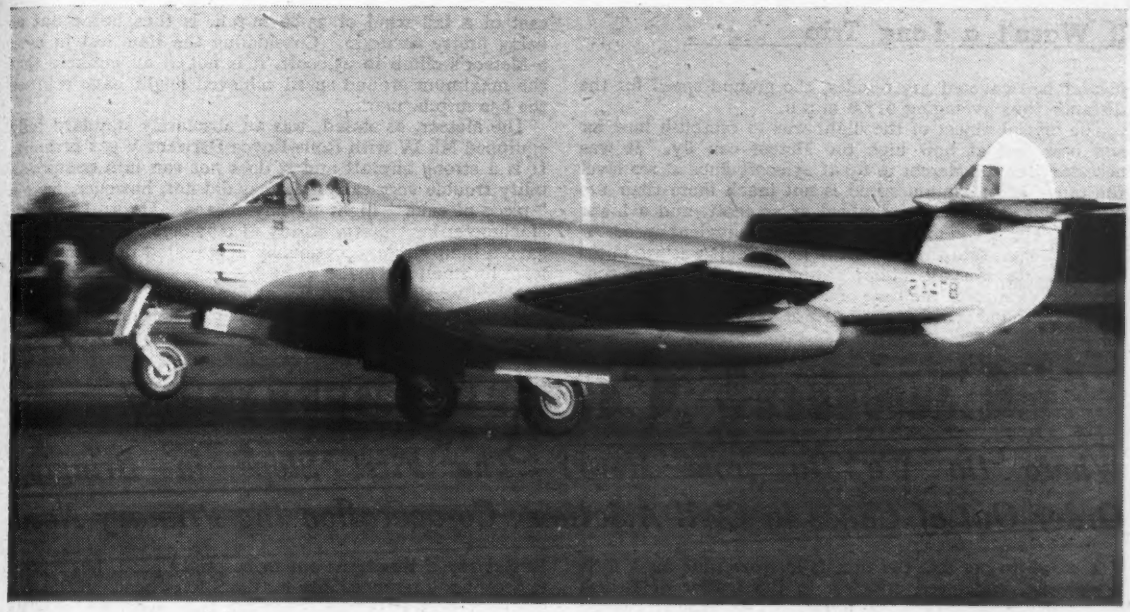
SCOTTISH AVIATION: A Liberator of Scottish Airlines (operational division of Scottish Aviation Ltd.) over its base at Prestwick. As recorded in this issue, the seventh anniversary of transatlantic flying to Prestwick was celebrated over the week-end. The particular Liberator depicted is now on a charter flight to Nairobi.



"IT WASN'T A VERY LONG TRIP"

Nine-year-old Edinburgh-London Record Broken by 209 m.p.h. in a Standard Meteor IV

IN the diamond-cold brightness of early morning, Tuesday, November 25th, a Meteor IV flew south from Scotland, its shadow flashing down the length of England at nearly 620 m.p.h. Half an hour after leaving Turnhouse, Edinburgh, the silver fighter passed the control tower at Bovingdon, Herts. Thus the Hurricane record of 408.75 m.p.h., established by the late S/L. Gillan's flight from Turnhouse to Northolt in 1938, has been broken.

The new record-holder is S/L. J. Lomas, D.F.C., an ex-night fighter pilot of No. 25 Squadron, who is now a member of the staff of the Fighter Interception Development Squadron, Central Fighter Establishment, West Raynham. Jim Lomas is 28 years old, enlisted in January, 1935, and was commissioned in November, 1941. His home is at Bircotes, Doncaster, Yorks.

Preliminaries

The decision to make an attempt to break the Edinburgh-London record was made some few weeks ago, but only on Monday, November 24th, did the meteorological pundits tell S/L. Lomas that the requisite high-velocity winds could be expected. This information was given late on Monday afternoon and, knowing that an aircraft was available, Lomas decided at once to have a crack. Having to attend a conference made it impossible for him to fly the Meteor up to Scotland until the early hours of Tuesday morning, and he actually took off from C.F.E. at about 2 a.m. It was a lovely night, and at Linton-upon-Ouse he landed to refuel, taking off again immediately for Acklington, Newcastle, where he again refuelled and managed to snatch about three hours sleep before pushing on to Turnhouse.

The Met forecast of strong, favourable winds having been

(Above) The Meteor IV lands at Bovingdon airfield half an hour after leaving Edinburgh.
(Below) Squadron Leader James Lomas, D.F.C., pilot of the record-breaking Meteor.

reaffirmed, Lomas lifted his aircraft from Turnhouse at 0915. At 0916.30 the Meteor, low down, on course and flat out at 600 plus m.p.h., flashed past the control tower at Turnhouse and immediately went into a rocket climb up to 25,000ft. Three stop watches at Bovingdon were all started on a "go" signal by land line from Turnhouse.

At 25,000ft S/L. Lomas reduced the r.p.m. of the Derwent Vs to 13,600 and settled down to fly the aircraft as steadily and accurately as he could. Some six minutes after take-off he made contact with a GCI station which could give him coverage to within about 50 miles of Bovingdon. Flying on his DR compass with contact checks and the occasional confirmation from GCI, Lomas was able to make a straight-line track without trouble. Jet-pipe temperatures remained pretty stable at about 530 deg C and at about 60 miles distance from Bovingdon Lomas put his aircraft into a shallow dive which brought him past the Bovingdon tower at "sea level" and maximum speed, the time being 0946.55. The three watches were thus stopped thirty minutes and twenty-five seconds after they had been started. During the time they had been ticking away the

It Wasn't a Long Trip . . . . .

Meteor had covered 313.1 miles, the ground speed for the distance thus averaging 617.6 m.p.h.

The official object of the flight was to establish how far and how fast at how high the Meteor can fly. It was necessary for the Meteor to fly at 25,000ft since at sea level the range at maximum speed is not much more than 120 miles; this, however, is doubled at 20,000ft, and a lower throttle setting can also be used for an equivalent speed.

S/L. Lomas said that his I.A.S. at 25,000ft was 330 knots which, at a conservative temperature correction for the conditions obtaining at the time of the flight, would be equivalent to a ground speed of the order of 535 m.p.h. The forecast of a tail wind of 75-80 m.p.h. is thus borne out as being pretty accurate. Considering the time lost in even a Meteor's climb to 25,000ft, it is not at all unlikely that the maximum ground speed achieved might have eclipsed the 650 m.p.h. mark.

The Meteor, as stated, was an absolutely standard fully equipped Mk IV with Rolls-Royce Derwent V gas turbines. It is a strong aircraft and it does not run into compressibility trouble very early. Lomas did not, however, have a "piece of cake" flight by any means. He said that his Machmeter kept pretty steady at 0.77-0.78; and this speed gave a lumpy ride, occasionally aggravated in quite severe form by small thermals.

Asked what he had to say about the flight, S/L. Lomas replied, "Well, it wasn't a long trip, that's all."

Casual Commentary

Where Do We Go from Here? The First Steps in Bringing Order Out of Chaos in Civil Aviation : Co-operation the Primary Need

By ROBERT CARLING

IT seems to me that the time is long overdue for a little honest, wide-eyed criticism in the matter of British civil aircraft. To the interested onlooker it would appear that there has been a signal lack of co-ordination and co-operation between the operators, the Ministries and the industry—so that we are now faced with the possibility that we shall eventually have a complete series of semi-experimental civil aircraft which are wanted by nobody. At the same time, paradoxically enough, the operators will have finally worn out the varied contraptions which they are now compelled to use and will be looking for new equipment.

Before anyone can pounce on me I will say immediately that there are and will be exceptions amongst the range of orphan aircraft, that there have been cases of close co-operation, and that the originally conceived plan certainly appeared to be tolerably water-tight when it was made—but, by and large, nobody in high places will deny that the present situation closely approximates to chaos.

Without going too deeply into near-recent history, let me offer a few examples of the divergent views and plans through the haze of which somebody or other is expected to see a clear picture of the needs for the immediate future. There are, either under construction, finished, or in service some six Brabazon types, one semi-Brabazon giant flying boat, two planned interim landplanes in the large class, four assorted medium-size landplanes (one of them Corporation-sponsored), two flying boats, and, recently ordered, a long-range Empire landplane of conventional design. This makes sixteen in all which I can immediately bring to mind. Of these, seven are wanted or are already in service, five may be wanted, and four have, so far, no takers.

For whom were the nine orphans intended? In all fairness, it must be admitted that, at the time when the majority of the sixteen were laid down, there was only one Corporation in existence, but this and the two new Corporations have shown themselves to be, from the point of view of the Ministries, most irritatingly ready to take advantage of their guaranteed independence.

In fact, whatever the faults of the Ministries and their planners, all three Corporations have shown such an unexpected degree of independence and such a divergence of opinion amongst themselves that the plans (whatever they were) could hardly have been expected to work. Indeed, the present lack of inter-Corporation technical co-operation is likely to prove one of the major difficulties in any ministerially developed programme—however intelligently it may be arranged for the future.

Take the case of the two big prestige aircraft. The senior Corporation thinks that it might make some use of the Bristol 167 if this turns out to be pretty good, but refuses to accept any responsibility for the S.R.45 boat. B.S.A.A., however, appear to think that the boat may be just what they need. Meanwhile, nobody, with the present passion for economy, is likely to build either suitable runways or the necessary boat facilities—so the whole thing becomes rather academic. Again, while B.O.A.C. find the Tudors unsuitable either for the Empire or Atlantic services, B.S.A.A. execute a series of delighted handsprings at the very mention of the type and condemn out of hand those who criticise it. Finally, not to let B.E.A. go scot-free, this enthusiastic Corporation, after overworking steadfastly on the development of its replacement type (looking neither to the right nor to the left) is suddenly made aware of the virtues of an aircraft which is already in existence. Pavlov's neurosis hounds must have been placid by comparison with the B.E.A. technicians as they make their decision.

Now it seems to me that before the Ministries can begin to put their planning houses in order the technicians of the Corporations should go into a conference from which they must not be allowed to emerge until a clear-cut plan of their combined requirements can be offered. On second thoughts, perhaps we had better exclude technicians, as such, and make it a meeting of managing directors, each with one technical assistant only. The technical tails are already wagging the Corporation dogs all too freely, and no committee of more than three or four people has ever yet reached a satisfactory conclusion. But we must find a really strong and knowledgeable chairman for the meeting—one who is respected both by the three members *and* their assistants. I have my own idea of the right man.

Much-Needed Weeding

It would be the responsibility of the meeting to make the best possible use of existing material, but to be ruthless in throwing aside those designs or duplications which can play no obvious part in the Corporations' services during the next ten years. At a second session, the same committee of (I hope) realistic people might decide on the best types to be developed for export. If this second session immediately follows the first, it is reasonable to suppose that the various production plans would be satisfactorily laid together.

Afterwards, an equally small and select meeting of Ministry nabobs could be held to tie up the remaining threads. With their minds free from the need to think of near-immediate airline requirements, and resultant production time-tables, the members of this committee would concern themselves solely with project development and

research, and with any means for ensuring that all other essential units in the industry are kept employed on brain-sharpening exercises of definite value. No files would be allowed in the conference room; the delegates would be permitted only some sheets of good white paper and a list of aircraft manufacturers, with their design and production capacities and commitments briefly detailed. Let us endeavour to use our common sense on these occasions, rather than to lose ourselves in a maze of facts and statistics.

And what, you may ask, of the charter companies? I have deliberately left them out of the picture for one good reason. They form the only genuine commercial undertakings in civil aviation; apart from the fact that they have the use, for a nominal payment, of airfield and flying control facilities, they stand or fall according to the simple and universal law of supply and demand. Already united—or at least capable of being so—in their own Association, the larger concerns among them can nibble their quotas of big aircraft out of the Corporations' requirements, and the small charter type of the future will surely appear as a result of natural demand. If the industry cannot supply such a type against a definite demand, then indeed this industry has finally lost its commercial instincts.

I have also ignored the aircraft industry because I am doubtful of its overall capacity to instigate or finance, by itself, the construction of modern civil aircraft. For too long this industry has been spoon-fed, and, with a few very notable exceptions, it has got out of the habit of taking its own line. Since the capacity of any firm to accumulate reserves has been crippled by E.P.T., and the cost of financing advanced prototypes is rapidly becoming astronomical, the greater part of the industry is, in any case, in the pocket of the Ministries—and of the Treasury.

Whether the industry, left to itself, would have produced what is wanted—and whether prototype costs would have been quite so high if these had had to be paid out of past profits and estimated future profits—is something which will never be known. But I should like to see the industry's accredited body taking more interest in the broader picture.

By way of a start, the technical section of the S.B.A.C. might arrange to circulate, confidentially, the inside story of the test development of each non-secret prototype, so that the industry as a whole may at least learn from its own mistakes. If this section is on its toes (and in the know) there will be little chance that any of our more cunning manufacturers will succeed in making themselves appear to be faultless—and such a system will at least help to supplement the garbled stories which have always been circulated about prototype trials.

OXFORD SQUADRON DINNER

THE importance of maintaining the structure of the Royal Air Force and its initial striking power was stressed by the C.A.S., Marshal of the Royal Air Force Lord Tedder, at the annual dinner of the Oxford University Air Squadron held on Friday, November 28th at the Randolph Hotel, Oxford. Lord Tedder, who proposed the toast of "The Squadron," said that out of ten men who were in the Air Force on VJ Day, nine were now out of the Service. "With regard to the remaining one, more than half of them have only been in the Service about a couple of years, and those are the conditions under which we are expected to maintain an efficient service" a highly technical and rather important Service.

"The trouble now is that the Air Force has an enormous responsibility laid upon it," said Lord Tedder, referring to the recent statement made by the Minister of Defence. "This country needs the best brains to ensure that we are strong in the air, and the people as a whole understand this and will help towards this end." Speaking as a Cambridge man, Lord Tedder admitted that Oxford was one of the main sources of the best in the country. He said: "In proposing the health of your University Squadron, I am proposing something much bigger—the best in the country."

In reply to the C.A.S. Mr. H. P. Palmer, of Queen's College, repeated the annual plea that the squadron should be equipped with aircraft a little more advanced than Tiger Moths. He said that it would give members a point to aim at if they could transfer to something really fast.

W/C. J. R. A Embling, the squadron's chief instructor, proposed the toast of "The Guests." He said that the O.U.A.S. was doing fairly well although it had not perhaps got as much flying in during the year as it would have liked. "We have more flying members than we had this time last year, but we are not quite full, and I hope all will see that we get the best people to apply to join the squadron and enjoy its benefits," he said, adding "We have room for a few more, but we don't intend to lower our standards just to take in the multitude who may offer." W/C. Embling stressed the importance of the volunteer spirit and said that one of the greatest problems was the question of reconciling State planning of any sort with freedom for the individual.

The Vice-Chancellor of the University, Dr. W. T. S. Stallybrass (Principal of Brasenose College) said in reply that the Battle of Britain would never have been won but for the Oxford University Air Squadron. "We are proud of the Air Squadron; we are glad it is as good a club as it ever was and that it consists of as gallant a body of men as those who went before."

In addition to Lord Tedder, the guest list included the names of Air Vice-Marshal W. F. MacNeece Foster; A. Cdre. F. L. Pearce (A.O.C. No. 26 S.R. Group); G/C. R. L. Wallace (Headquarters Reserve Command); G/C. P. W. M. Wright (Commanding R.A.F. Station Abingdon); W/C. Viscount Acheson (chief instructor Cambridge University Air Squadron); and Lt. Col. R. Dawnay, Goldstream Guards (O.C. the Oxford University Senior Training Corps).

PRESTWICK'S SEVENTH ANNIVERSARY

EVERY year a dinner is given at Prestwick by the Directors of Scottish Aviation, Ltd., in celebration of the establishment of transatlantic air services to that great Scottish airport. This year, on the occasion of the seventh anniversary, the Duke of Hamilton welcomed His Excellency the American Ambassador, Mr. Lewis Douglas, with warming references to the clan of Douglas, of which both are members. Mr. Douglas replied in a speech which, though deeply earnest in tone when concerned with political matters, was in part a happy history of his Scottish ancestry. Among his remarks on aviation was a recollection of the "flocks of fighting aircraft which flew over the turbulent waters of the North Atlantic" and of a combined command, "as selfless as it was successful." Prestwick, said Mr. Douglas, was a reminder of the past and a preceptor of the future.

To illustrate progress in air transport, he recalled the old Handley Pages on the London-Paris service (and earlier machines, which behaved "with a fickleness characteristic of the opposite sex") and made mention of the lovely murals in the airport hotel at Prestwick, depicting the extraordinary advances made in a short time in a new medium. The Rt. Hon. Thomas Johnston replied and the Rt. Hon. Walter Elliott spoke for the guests.

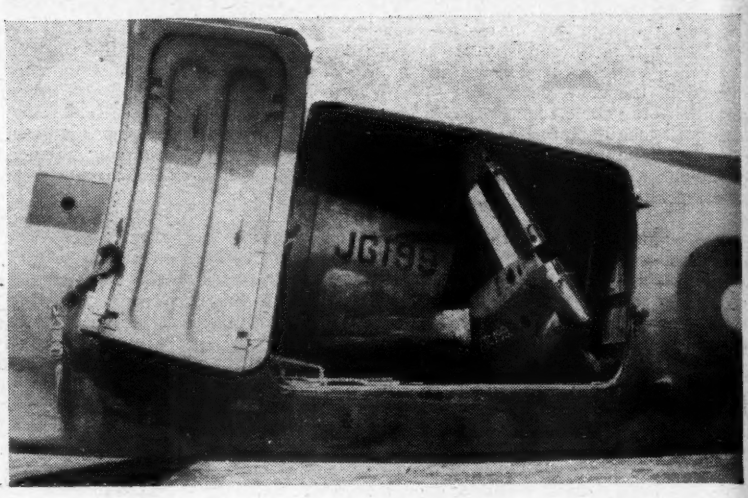
Before leaving Prestwick for Northolt on the following morning in a Scottish Airlines' Dakota, guests, who included Air Attachés and civilian representatives of many nations, were treated to a brief demonstration of the Prestwick Pioneer light transport machine, flown by Mr. R. C. W. Ellison. Progress with this unusual aircraft, and other activities at Prestwick, will be surveyed in the next issue of *Flight*.

R.A.F. AT CLEVELAND

WE are given to understand that an official invitation has been extended to the Royal Air Force to compete at the 1948 Thompson Trophy Air Races at Cleveland, Ohio. Although we have not received official confirmation we are led to believe that Fighter Command have accepted the invitation. If this information is, in fact, true—and we have no reason to doubt the veracity of our source—the matter is of very considerable interest and certainly warrants the issue of an official statement at the earliest possible moment.

It should not necessarily be implied that the R.A.F. entry would be for a high-speed race with military jet aircraft. In addition to closed circuit races for aircraft of various engine capacities, the Cleveland air meeting also includes such events as demonstrations of aerobatics and trick flying, and formation keeping by Army and Navy aircraft. It is, of course, not impossible that any British competition might be in the latter category. We hope to be in a position to publish further information on this interesting subject later.

HERE AND THERE



EVIDENCE: When Mr. J. Rasmussen, Chief Liaison Officer for Supermarine, returned from the Far East he informed his colleagues that he had flown in a Spitfire from Akyab to Calcutta. Mr. Rasmussen is not a pilot, and the "Spit Trainer" had not then materialized. Explanation: the cockpit of the Spitfire in the Dakota fuselage offered the only seat.

Artificial Rain Success

SQUADRONS of the Dominican Air Force successfully induced an artificial rainstorm by dropping dry ice on cloud formations at the end of last month, and it is stated that results were good enough to save crops worth £4,000,000 in the Republic.

In the U.S.A., experiments are to go on throughout the winter. It is not yet known whether the dropping of dry ice over a hurricane in October ("Project Cirrus") proved worth while, but this time it is to be followed. Experiments will be planned to avoid risk of heavy rainstorms or blizzards over cities—the wide open spaces are to be used for all tests.

Aviation Diary

A "CIVIL AVIATION DIARY" for 1948 is being published by Collins Clear Type Press. It embodies a great deal of information, including lists of air routes, British civil airfields, clubs, air organizations, the world's civil aircraft, with sketch illustrations, memos on navigation systems and radio, and six maps in colour. It is, in fact, a little handbook, conveniently arranged, and pays a penalty for this in being rather fat for a diary—half an inch. The publishers are Wm. Collins & Co., Ltd., 144, Cathedral Street, Glasgow, C.4, and the price is 3s, 3s 6d, 4s 3d and 5s 6d (plus purchase tax), according to binding.

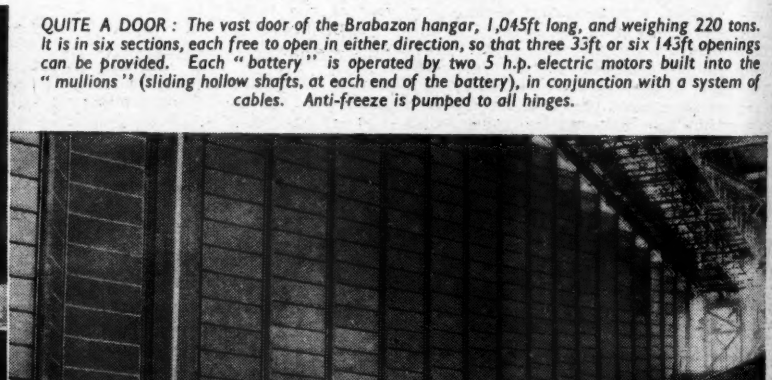
Piper Super Cruisers

IN a reference to two American flyers' projected world flight in a Piper Super Cruiser (*Flight*, November 20th) it was mentioned that Field Aircraft Services, Ltd., imported and assembled these aircraft in Great Britain. This has, of course, been work carried out for Mr. A. J. Walter, Steps, Deepdene Drive, Dorking, Surrey, who is the sole concessionaire for Piper aircraft. The flight is still postponed for more favourable weather, according to the latest reports.

American Students' Design

STUDENTS at Northrop Aeronautical Institute have pooled their ideas on private aircraft and with the co-operation of the firm are building a prototype. It is to be a twin-boom design with a pusher airscrew, and a feature is the particularly easy entrance into the cabin. Although the design represents the ideas of the students, it has been "vetted" by the regular Northrop engineers before production began.

In 1934, it is interesting to recall, the de Havilland Technical School students designed the TK 1 single-seater biplane with Gipsy III engine, and this machine reached the finals of the King's Cup races, while in 1935 their TK 2, a low-



QUITE A DOOR: The vast door of the Brabazon hangar, 1,045ft long, and weighing 220 tons. It is in six sections, each free to open in either direction, so that three 35ft or six 145ft openings can be provided. Each "battery" is operated by two 5 h.p. electric motors built into the "mullions" (sliding hollow shafts, at each end of the battery), in conjunction with a system of cables. Anti-freeze is pumped to all hinges.

HERE AND THERE

wing monoplane, was also entered for the King's Cup. The TK 2, it will be remembered, reached the final of the Folkestone Trophy race at Lympne on August 31st this year, and flew an extra lap to average 178.33 m.p.h. and beat a class record for the 100 km closed circuit. At the Southend races on August 9th, the TK 2 won the second heat for the Southend Cup at 173.5 m.p.h.

An Appeal for the R.A.F. Fund

WITH the approach of Christmas, the Royal Air Force Benevolent Fund is appealing on behalf of its two schools —Vanbrugh Castle, Blackheath, for boys of seven upwards, sons of airmen who have been killed or died, and Rooks Hill House, near Sevenoaks, for orphan children of aircrews, aged between two and seven. The appeal is for furniture, mats, rugs or other floor coverings, books for children and staff, toys (particularly for Rooks Hill) and cupboards. In addition, the controller would be very grateful for any invitations to the children to attend Christmas and New Year parties within reach of the schools.

Australian Missions to U.S. and U.K.

SPECIAL missions of the Royal Australian Air Force to Britain and the U.S.A. next year have been announced by Air Marshal George Jones, chief of the Australian Air Staff. One object of the missions, it is understood, is to exhibit Lincoln bombers manufactured in Australia, and another will be to familiarize aircrews with changing conditions of service flying in other countries.

Flying Laboratory

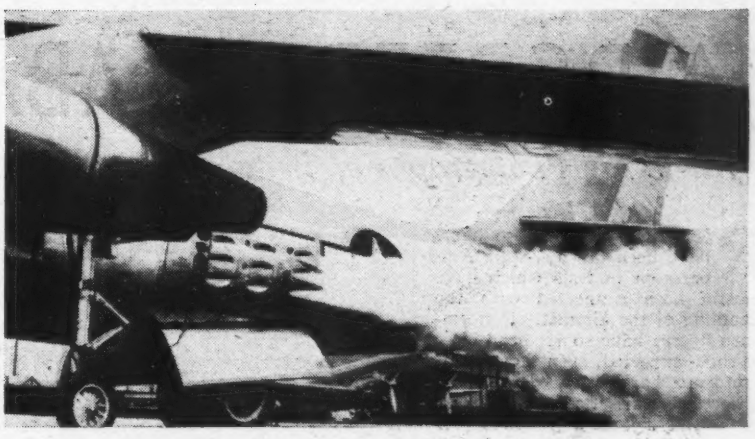
A HUDSON which was put into service in 1941 by the Sperry Gyroscope Co. for testing a succession of gyro-pilots, radar devices, instruments and navigation equipment has been lent indefinitely to the University of Southern California's College of Aeronautics as a flight research aircraft. When it has completed its service with the College, it will go to a place already reserved in the National Aeronautical Museum.

Jet Fighters' Gunnery Results

LOCKHEED P-80 Shooting Stars of the U.S.A.A.F.'s 56th Fighter Group recently claimed 55 per cent hits in 11,000 rounds of air-to-ground and 37 per cent in 45,000 rounds of air-to-air firing, and the Colonel of the Group states that this jet-engined aircraft makes an excellent and steady gun platform, which compensates in part for the difficulties associated with high speed. Similar results have been obtained here with Meteors.

132-ton Aircraft Flying

CONSOLIDATED VULTEE'S XC-99 troop, cargo or hospital transport built for the U.S.A.A.F., made a first test flight on November 20th. Gross weight is understood to be 132 tons and 400 passengers may be carried. Another advanced type, the U.S.A.A.F.'s North American XP-86, has also made test flights. The XP-86 is a single-seater with thin wings of 37ft span swept back at an angle of 35 deg and powered by an Allison turbo-jet producing 4,000-lb thrust. Performance figures are secret.



BUILT-IN TAKE-OFF ROCKETS: Three of the assisted take-off rockets which are built into the new Boeing XB-47 bomber are shown under test. There are 18 of these rockets on the XB-47, which is to make its first flights this month, and they are said to produce an 18,000-lb thrust.

but during the tests it is understood that 600 m.p.h. was exceeded.

King Michael's Helicopter Trip

ALTHOUGH the Fairey works have moved from Heston to White Waltham, the old airfield was used when King Michael of Rumania was taken for a flight in the company's Sikorsky R.4 during his visit to England for the Royal Wedding. The King did not actually pilot the machine, as was reported in some quarters. Heston was used as that was more convenient on this occasion than White Waltham, which is considerably farther from London.

Yes, Please!

SEVERAL Swiss winter sports hotels have invited "many hundreds" of their ex-patrons to spend Christmas and New Year holidays in Switzerland free of charge, says a Zurich paper, *Volksrecht*. To avoid long train journeys without currency, many of the members of this Free English movement are going by air, and B. E. A. and Swissair bookings are reported to be heavy.

News in Brief

Winter has come to Scandinavia and the sea-air base at Fornebu, Oslo, has frozen and been closed down. D.N.L. Sandringhams service normally use the base.

* * *

Ministers of Cabinet rank can use their own discretion in chartering aircraft, but Treasury permission is needed in the case of officials, while Service aircraft can be used by either at the discretion of the Air Ministry. This is the position as explained to a questioner by Sir Stafford Cripps in Parliament recently.

* * *

W/C. E. Huntley, who has been working in Branch E.36 of the Air Ministry, in charge of petrol rationing generally, returned to Shell-Mex on December 1st as district manager.

* * *

To-day at 5.30 p.m. for 6 p.m., readers are reminded, there is a meeting of the Royal Aeronautical Society at the Institution of Civil Engineers, Great George Street, London, S.W.1. Mr. N. E. Rowe is reading a paper on "Problems Facing Civil Airline Operations."

* * *

An R.C.A.F. Dakota recently landed on a frozen lake 400 miles inside the Arctic Circle to rescue a seriously injured missionary. Waiting with him were a medical team dropped by parachute.

* * *

His many friends in the aircraft world will be glad to know that S/L. H. W. McKenna, who has been very ill with pneumonia, is now making good progress towards recovery. Enquiries may be made by telephone to Mayfair 5401.

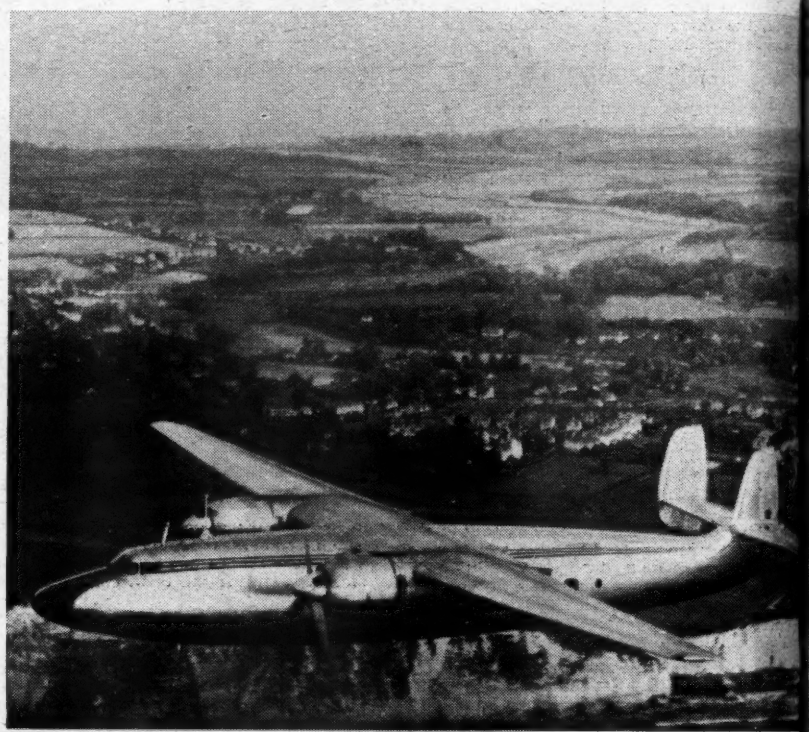
* * *

D.H. Doves have been purchased from Airwork Limited by Prince Aly Khan, Dr. John Williamson, the Canadian financier, Mr. Steven Courtauld, the film magnate, and Mr. Thomas Bata of the shoe firm. Miles Geminis have been acquired from the same firm by Prince Birabongse, Mr. Walter Hutchinson, the publisher, the Regent of Iraq and Prince Omar Halim of Egypt.

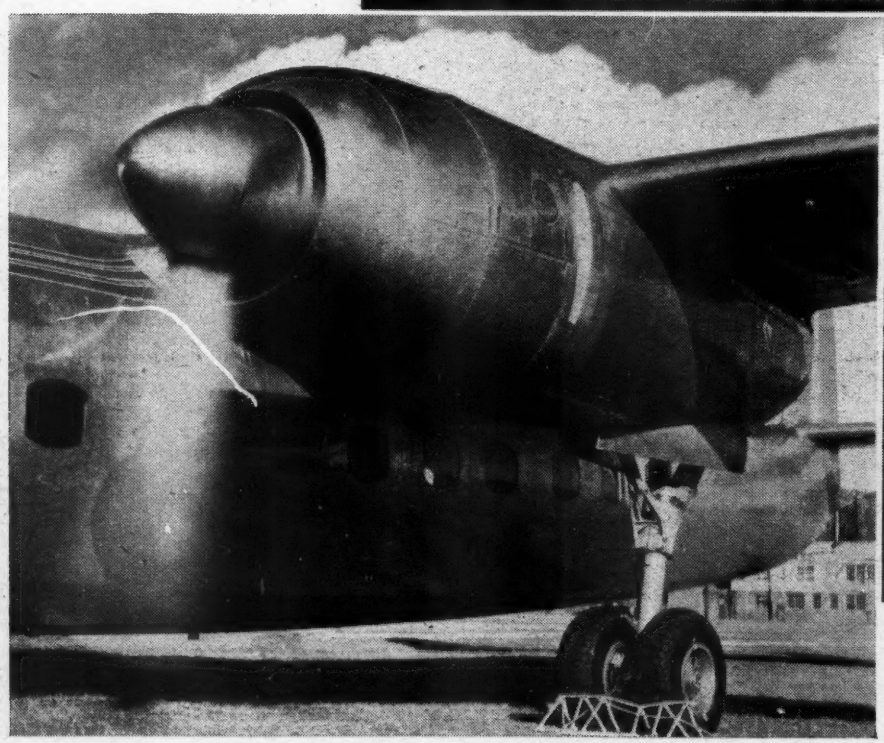
AIRSPEED AMBASSADO

Air-to-Air Photographs of Britain's Most Elegant Air Liner : Single-En

RATHER more than 50 hours have been flown by the Ambassador in tests which have mostly been connected with the handling of the aircraft. Performance figures have so far been close to those expected, even though this prototype has a great deal of exterior test gear. Perhaps the most impressive figures were those for flight with one airscrew feathered, when the rate of climb was 770 ft/min between 4,000 and 5,000ft at maximum continuous (not take-off) power. Again with one engine dead, the aircraft was controllable at take-off power down to a speed of about 110 m.p.h. The maximum continuous w.m. cruising speed was found to be 204 m.p.h. at 5,000ft, using 35in of boost, and that speed is only 3 m.p.h. below the performance which was expected. The tests have unfortunately been interrupted owing to the recent mishap, but it is understood that the repairs are progressing favourably and that the aircraft will be in the air again shortly.



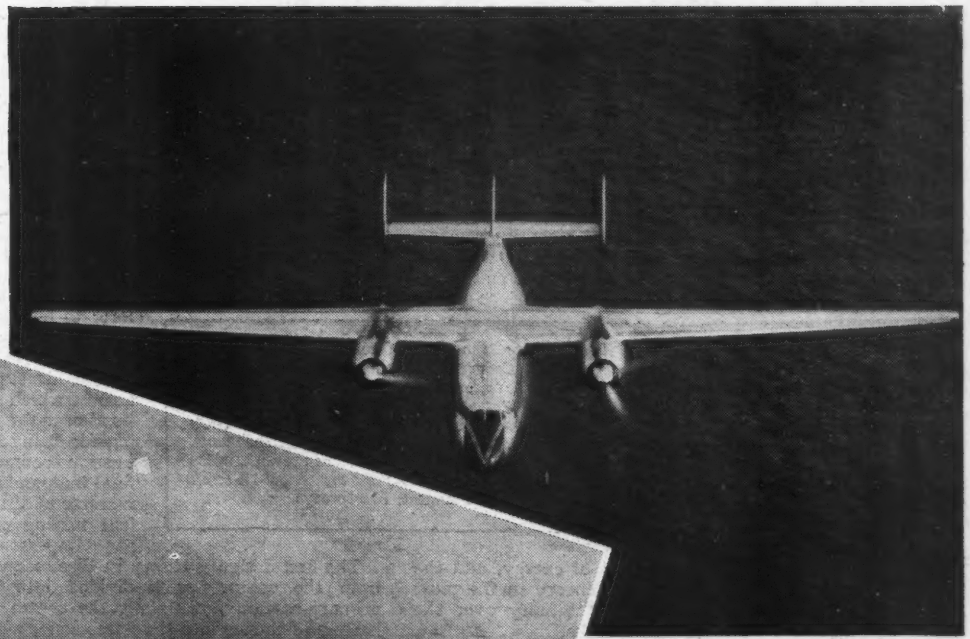
Piloted by Mr. G. B. S. Errington Airspeed's chief test pilot, the Ambassador is seen over Freshwater Bay.



(Left) The power egg of the Bristol Centaurus is a model of close cowling and cleanness of outline.

...rformance

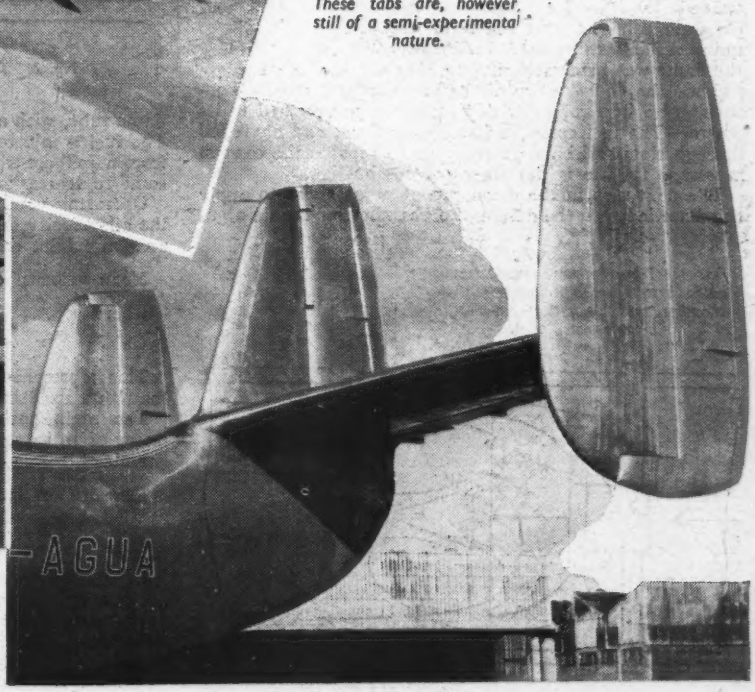
...ow) A three-quarter ... view emphasizes the ...ct of the high-wing ...ut on passenger view.



This frontal view of the aircraft shows not only the exceptionally clean upper surface of the wing, but also that the lines of the fuselage remain perfect, despite the foreshortened effect due to perspective.

An impression of the Ambassador's tail with its new rudder tab arrangement. These tabs are, however, still of a semi-experimental nature.

Mr. Errington taxies the prototype Ambassador past the control tower on Christchurch airfield before taking-off on a test flight.



The "T-Scheme"

A Low Pressure-Loss Combustion Chamber System for Gas Turbine Engines

By P. F. ASHWOOD, B.Sc.(ENG.), D.I.C.

DEVELOPMENT of the low pressure-loss combustion chamber actually began in 1943, when experiments were made to discover whether a flame could be maintained in a fast-moving air stream without undue loss of energy. The problem of keeping the flame alight is complicated by the slow rate of flame propagation (between 1- and 2ft/sec) of liquid hydrocarbon fuels. Since mean air velocities very greatly in excess of this value have to be used, it is necessary to place a baffle in the air stream to produce a local region of turbulence and low velocity in which combustion can be initiated. The creation of turbulence naturally involves a loss of energy, and the chief design problem is to utilize this energy in the most effective way in order to give flame stability over the widest possible range of mixture strengths.

THE author is a Senior Scientific Officer engaged in the Combustion Department of the National Gas Turbine Establishment at Pyestock. In this article are presented the results of a long series of investigations, experiments and tests of a low-loss combustion system for aircraft gas turbine units. The work was commenced in 1943 at Pyestock, which was then an out-station of the Royal Aircraft Establishment, Farnborough.

The combustion chamber used in the early tests consisted merely of a baffle contained in a plain tube, the fuel being injected upstream in the wake of the baffle. After many tests a design was developed which enabled a flame to be maintained in an air stream moving at 250ft/sec with a pressure loss caused by the baffle of less than twice the dynamic head in the free stream; that is, an energy loss of less than 2.5 B.Th.U/lb air. This was achieved by injecting the fuel upstream in such a way that the vortex produced by the baffle combined with the gases entrained by the fuel spray to recirculate some of the flame to the unburnt fuel-air mixture. In this way the flame was made self-piloting. Fig 1 shows the flow pattern of the gases around a baffle consisting of a hemisphere with a hollow cone attached to its centre. The fuel spray enshrouds the cone, and air is fed through slots and holes in the cone to provide the oxygen necessary for the initial stages of combustion.

The next step in the development process was to apply this knowledge to the design of a chamber for use on a gas turbine engine. It was obvious that the simple tube and baffle system could not be used, since it gave high combustion losses at part-load conditions and required a greater length than could be accommodated on an engine. A more conventional layout had, therefore, to be adopted, and it was decided to use an isolated primary zone to which only part of the air supply is admitted, and in which most of the combustion takes place, the remaining air being added after combustion is complete to reduce the final temperature to a value permissible at the turbine. Turbulent mixing ensures a uniform gas temperature at the outlet.

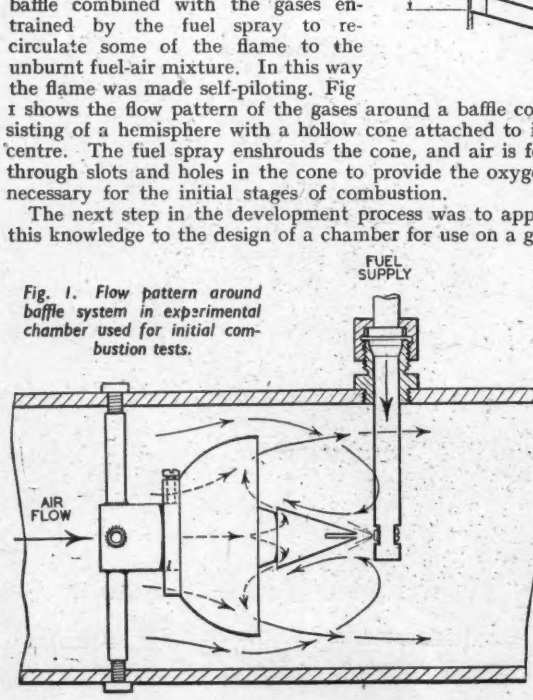


Fig. 1. Flow pattern around baffle system in experimental chamber used for initial combustion tests.

The first design is shown in Figs. 2 and 3. Air entering from the compressor is divided into two parts. The primary stream flows along the centre diffuser, past the baffle and thence into the flame zone, whilst the secondary air flows along the outer diffuser to enter the combustion space through holes in the flame tube. The baffle consists of a perforated flat plate, in diameter slightly less than the flame tube, with a sheet-metal cone attached to the centre. The fuel is injected in the form of a hollow, conical spray from a spill-controlled burner, the angle of the spray being some 10 degrees greater than that of the baffle cone.

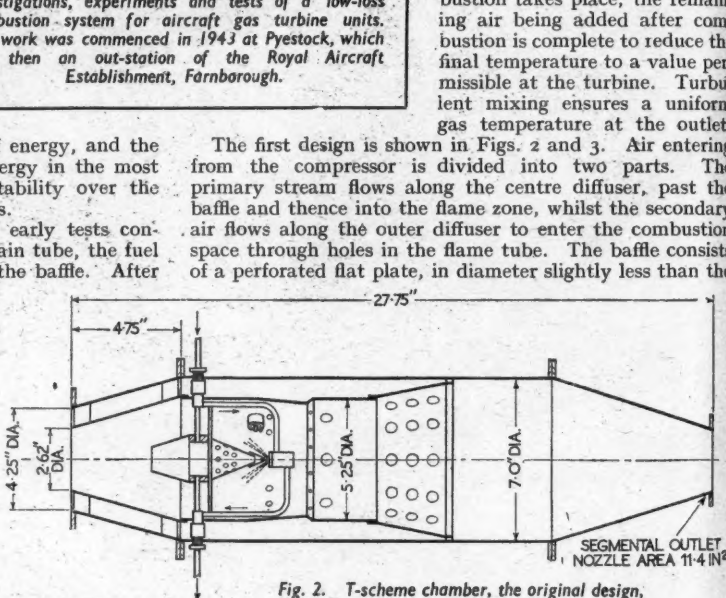


Fig. 2. T-scheme chamber, the original design.

Operating conditions were so chosen that at full load the air velocity calculated on the maximum cross sectional area and inlet density was 100 ft/sec. Thus:—

$$\text{Mean velocity } v_m = \frac{Qa}{A\,\rho_2} = 100 \text{ ft/sec}$$

where Qa = air mass flow ..... lb/sec
A = max cross section of chamber ft^2
ρ_2 = inlet air density ..... ft^3

This represented a velocity nearly 60 per cent higher than that used in contemporary chambers.

The main performance objective was a pressure loss factor of 10 as against the usual 30-40 of straight-through chambers.

$$\text{Pressure loss factor} = \frac{\Delta p}{\frac{1}{2g}\,\rho_2 v_m^2}$$

where Δp = total head pressure loss.

Other objectives were an outlet temperature variation not greater than 12 per cent on either side of the mean, no exhaust flame at full load, and freedom from carbon formation.

A design was eventually evolved which satisfied all these

The "T-Scheme". . . . .

requirements. The pressure-loss factor was 9.7 and the combustion efficiency at full load 98 per cent. However, one undesirable feature of the chamber was the large proportion of the overall length occupied by the inlet diffuser. To overcome this defect a new design was produced, the front end of the flame tube also performing the functions of the diffused wall.

Improved Chamber Developed

A drawing of the modified design is given in Fig. 4, which also shows the various flow paths of the air and combustion gases. The complete development of this chamber occupied many months, during which a large number of detailed design features were tested. Finally all the performance requirements were satisfied, and it was found possible to reduce the pressure-loss factor to 8, which corresponded to an energy loss of 1.6 B.Th.U/lb air.

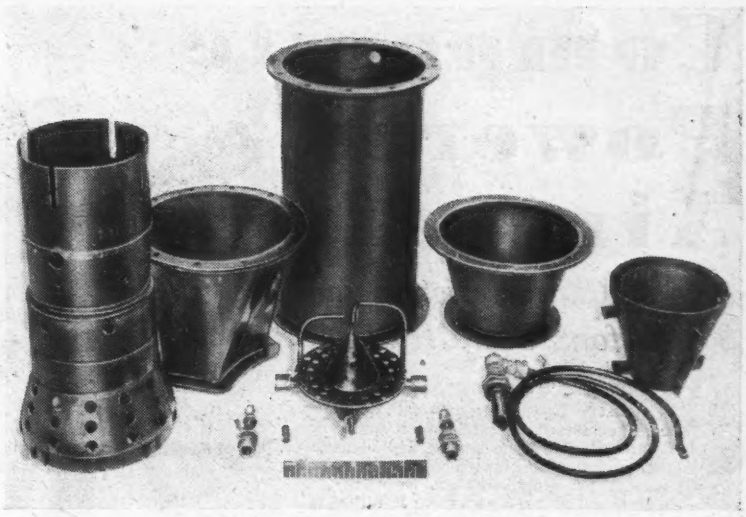


Fig. 3. Dissembled components of chamber.

In order to appreciate the benefits of low pressure loss, it is convenient to consider the effect of using the chamber on a hypothetical jet engine. Both pressure loss and combustion loss increase the specific fuel consumption over that which would be obtained with an ideal combustion chamber having no losses, and so these two variables can be combined into a single loss factor, namely, the percentage increase in specific fuel consumption.

Cycle calculations show that an approximately linear relationship exists between the increase in specific consumption due to pressure loss and the ratio pressure loss solidus compressor delivery pressure. It can also be shown that, for a given engine, this ratio is a function of combustion intensity, which may be defined as the heat release per unit volume of combustion space and expressed as:—

$$I = \frac{CHU}{ft^3 \times hr \times atm}$$

It is, therefore, convenient to express the variation of the overall loss factor in terms of combustion intensity. This has been done for some typical designs in Fig. 5. In this diagram the losses quoted for the T-scheme have been measured under conditions of symmetrical air velocity distribution at entry. In practice this condition is never realized, due chiefly to changes in the direction of the air flow between the compressor and turbine. Slightly higher losses would, therefore, have to be accepted unless a reasonably uniform velocity distribution could be achieved.

Fig. 5 also illustrates the two different ways in which the low loss factor of the T-scheme can be utilized. It is possible either to operate at an intensity similar to that of contemporary chambers and obtain a loss factor about half that of other straight-through designs or, if existing losses can be tolerated, a greater intensity can be used with consequent saving in space. It must, however, be realized that the comparison given in Fig. 5 is based on performance at full-power, ground-level conditions,

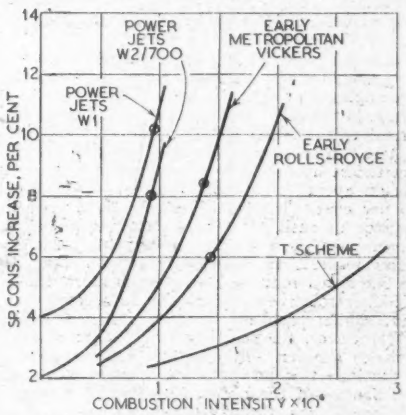


Fig. 5. Loss factor as a function of combustion intensity. Various systems based on 4:1 jet unit, G.L.S. ⊕ indicates intensity at which each system operates on its own engine.

which are the most favourable for combustion. A comparison based on other terms, for example cruising at 40,000 ft, might well reveal a different picture.

To summarize, it has been found possible to achieve a low pressure-loss factor without undue sacrifice of either combustion efficiency or range of stable burning. The T-scheme design is, therefore, well suited to engine applications which require either a low pressure loss or high velocities in the combustion system.

Research and development work on this and other combustion systems is being steadily progressed and forms an important feature amongst the many activities of the National Gas Turbine Establishment.

The author wishes to thank the Ministry of Supply for permission to publish the paper and accepts full responsibility for all statements made and opinions expressed therein.

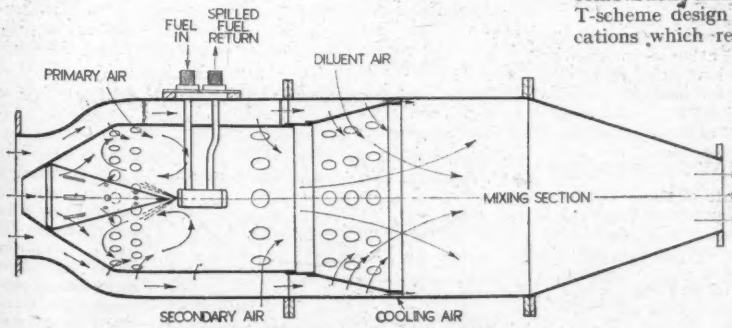


Fig. 4. Flow pattern in developed chamber.

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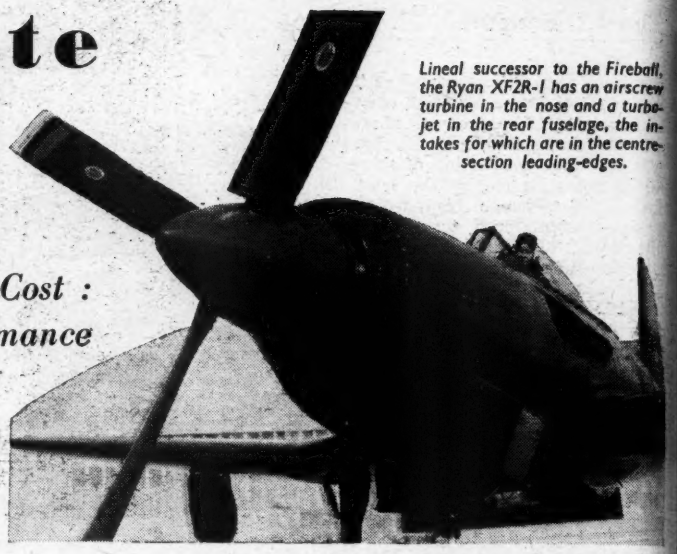
Composite Powered Aircraft

Engine Characteristics and Cost : Search for "Overall" Performance



Lineal successor to the Fireball, the Ryan XF2R-1 has an airscrew turbine in the nose and a turbo-jet in the rear fuselage, the intakes for which are in the centre-section leading-edges.

MR. BEN T. SALMON, former Chief Engineer, Ryan Aeronautical Company, has considered aspects of the composite-powered aircraft, which he defines as one having an engine driving a constant-speed airscrew, and an open-cycle jet propulsion gas turbine. The first machine of this type was the FR-1 Fireball, described as an all-altitude, and not just a critical-altitude fighter. More recently Ryan has completed the XF2R-1, with an airscrew turbine and a pure jet unit, which is undergoing exhaustive flight tests. Undoubtedly, says Mr. Salmon, the day is not far off when reduction of engine costs and development of better fuels will bring composite-powered air liners within the reach of the traveller. It is his opinion that, given a set of requirements for a new aircraft, so long as these include a requirement for high cruising or top speed, the one which is designed around the composite power plant will always excel in *overall* performance. To substantiate this statement he examines the types of power plant available and analyses the attainable performances.

First he considers the reciprocating engine, supercharged by either internal gear-driven or external turbo blowers, and described as a complex and sensitive machine, expensive to build and maintain, but still having a record of good reliability. An overall thermal efficiency of about 24 per cent has been realized in the latest version and, equipped with a well-designed airscrew, the net thrust horse-power output over a wide speed range represents an overall combined thermal-propulsive efficiency of 18-20 per cent. Next Mr. Salmon deals with the potential competitor of such an engine—the shaft-drive gas turbine. Here, he says, is a highly experimental machine, but one in many respects fundamentally simpler than the piston engine. The speed reduction problem is more difficult because of the higher rotative speeds, and the accessory and fuel systems have similar problems to those encountered with piston engines. However, the structure is lighter and installation characteristics simpler. Because of present operating temperature limitations this power plant appears to have a poor thermal efficiency—of the order of half that of a good piston engine. Nevertheless, through the incorporation of any of a multitude of possible cycle variations, and metallurgical and design advantages, the shaft-drive gas turbine is capable of realizing an overall efficiency of about twice that which is even theoretically possible for the piston engine. Moreover it would weigh less per horse-power developed.

The third type is the turbo jet, with centrifugal or axial flow. Both systems are still in a highly experimental stage and, because of the open cycle and limited operating temperatures, the thermal efficiency is low. Despite this, and providing the application is a proper one for jet propulsion, the turbine can be made to give outstanding thrust horse-power per pound of installed weight.

Full-throttle Consumption

One point which emerges during Mr. Salmon's deliberations is the question that if there is a turbo-jet in a composite-power plant, why is this arrangement more economical of fuel at full throttle than the pure jet. His answer is that so long as both throttles are "against the peg" it is not; perhaps it is greater. However, during combat, aircraft must have a tremendous flexibility of power at the command of the pilot, and a composite-powered machine will out-fight an adversary for more than 30 minutes, if necessary, on an amount of fuel which, at full throttle, will last for 10 minutes at sea-level in a pure-jet aircraft.

A question which might well be asked, says Mr. Salmon, is "Why bother with the complexity involved in dealing with both airscrew drive and a turbo jet?" His reason is found in the fact that more performance is needed than the present piston engine can supply, and all of this cannot be obtained simply by switching to pure jets. To illustrate the characteristics of a composite-engine installation he computes the performance of five Naval fighters, composite-powered, piston-engined and jet-propelled.

After quoting cost figures for the piston engine and turbine (the General Electric I-40 will cost about 7.5 dollars per pound, against 15 dollars per pound for the Allison V-1710 piston engine), Mr. Salmon concludes: "Even the fleetest planes must also start and stop, and many of these will have to operate under conditions requiring all of the attributes of both airscrew and jet."

THE NENE-GRUMMAN

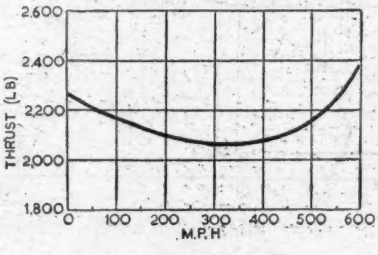
CHARACTERISTICS of the Nene-powered Grumman XF-9F fighter for the U.S. Navy, which has now flown, include wing-root entry ducts, guns in the long nose, a high-set tail and a leading edge which droops for landing. This last feature is dubbed the "droop-snoot" leading edge and is said to be effective. The aircraft is designed for Mach 0.85.

PATHFINDER ASSOCIATION MAKES MERRY

SEIZING the last opportunity of legitimate pleasure motoring, about six-hundred and fifty guests enjoyed a hilarious evening at the Pathfinder Association's Ball on Saturday, November 29th, at the Dorchester Hotel. For three-quarters of an hour the proceedings were on the air, during which time there was an amusing cabaret and A.V.-M. Donald Bennett broadcast a message wishing good luck to all Pathfinders, especially those, all over the world, who were unable to be present. He urged all to continue to "press on."

The Dagenham Girl Pipers Band introduced a Scottish note which was, as always, greatly appreciated. When the party broke up there were signs that yet another Pathfinder Ball had been a great success.

CORRECTED CO-ORDINATES



A thrust/speed curve for the D.H. Vampire in flight was published on page 610 of our November 27th issue. This was received and reproduced with incorrect thrust scale. On the left is the corrected version.

The Sealand prototype on its way from the assembly shops to the hangar.

SHORT SEALAND

First Prototype Aircraft to be Produced in Belfast: Latest Twin-Engined Amphibian: Also Available as Plain Flying Boat

ALTHOUGH it is only an hour or two distant by air, Belfast and its activities seem strangely remote to people in this country. One result has been that while the work which still goes on at the Rochester works of Short Bros. is well known, that of the closely associated company of Short and Harland at Belfast is heard of relatively infrequently. Soon Short Bros. will have completed their transfer to Northern Ireland, and the combined company, Short Bros. and Harland, Ltd., will advance the several existing and projected designs for large and small Short flying boats, landplanes and a new amphibian.

At the present time the boats are chiefly occupying Short and Harland's energies. Solents are in for equipment and modifications; the few Seafords are being transformed into Solents; Sunderlands are also being brought up to latest Mark V standards on mods. and equipment. The Shetland is being prepared for the 200 hours' testing and trials which are to be undertaken while the boat is on loan to B.O.A.C. Numbers of Avro Lincolns are also to be seen on the Belfast airport, where they are being prepared for the squadrons by the company.

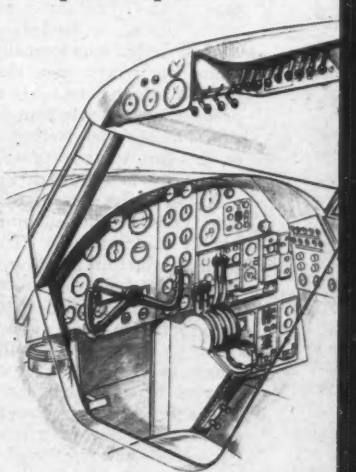
Towering above the hangars are the ruggedly picturesque gantries of the Harland and Wolff shipbuilding yards, from which was recently launched the 28,500-ton *Edinburgh Castle*.

In the aircraft production shops work is in hand on the target-towing Sturgeons, two of which are now well advanced, and nearby are jigs for the prototype Sealand flying boat amphibian which was recently completed. It is the Sealand, the first aircraft to have been built entirely at Belfast, with which we are here concerned.

Two considerations led to the conception of the Sealand: first, the recognition that there was an overseas demand for a satisfactory British amphibian, and that no civil type was then in existence; secondly, the company felt that it would be advisable to use their available space and facilities for the development of a medium-sized civil aircraft to augment their "official" production programme. Shorts were well aware of the difficulties involved in designing and producing an amphibian, but felt themselves better equipped than most concerns to tackle the problems—in particular to improve the water performance, which often leaves something to be desired in the case of amphibians. Readers may recall earlier amphibious machines designed by the company, in particular the Hermes-engined two-seater Mussel of 1930 and the Kestrel-engined Gurnard of a year later.

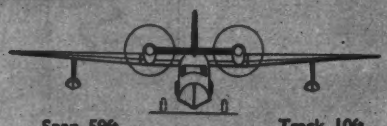
Regarding the operation of amphibians and the often-repeated criticism that such machines are at a disadvantage when compared with a landplane, it is pointed out that, when used in their proper sphere, amphibians have no rivals. There is a definite demand for an aircraft which can take off from one element and land on another, although it is admitted that under normal circumstances it is not an economical proposition to operate amphibians on long-range stages. The sacrifice of some payload in order to carry landing wheels on a flying boat is unavoidable, but over short ranges this can reasonably be expressed as a reduction in the fuel carried rather than in freight or passenger capacity. Performance and direct operating costs are virtually the same for an amphibian as for a landplane.

From the private owner's point of view the undoubted pleasure and convenience of being able to operate either from land or water should not be overlooked.

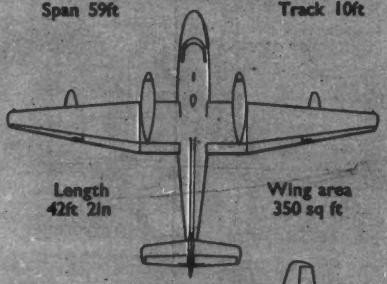


The pilot was consulted at every stage in the planning of the Sealand cockpit, and the result has been an unusually neat and convenient arrangement.

SHORT SEALAND...



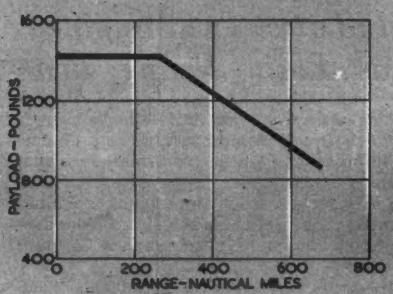
Span 59ft Track 10ft



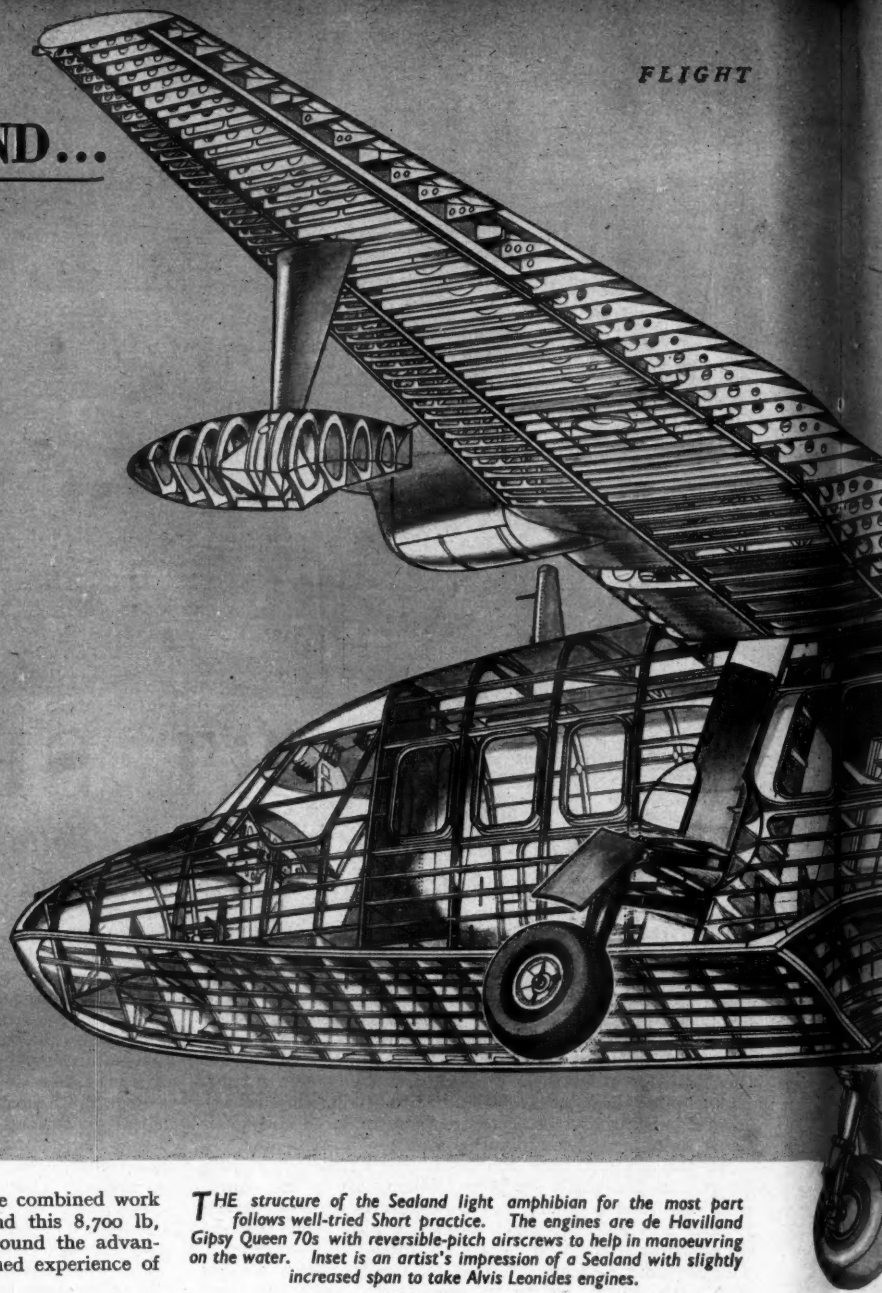
Length 42ft 2in Wing area 350 sq ft

Draught at main step 2ft 11in
Ground clearance at main step ... 8.5in

Two D.H. Gipsy Queen 70 engines with three-blade reversible constant speed airscrews.



Range/payload curve.



THE structure of the Sealand light amphibian for the most part follows well-tried Short practice. The engines are de Havilland Gipsy Queen 70s with reversible-pitch airscrews to help in manoeuvring on the water. Inset is an artist's impression of a Sealand with slightly increased span to take Alvis Leonides engines.

The design of the Sealand has been the combined work of the Rochester and Belfast offices, and this 8,700 lb, 5/8-passenger transport has as a background the advantage of the company's unrivalled combined experience of flying boats and landplanes.

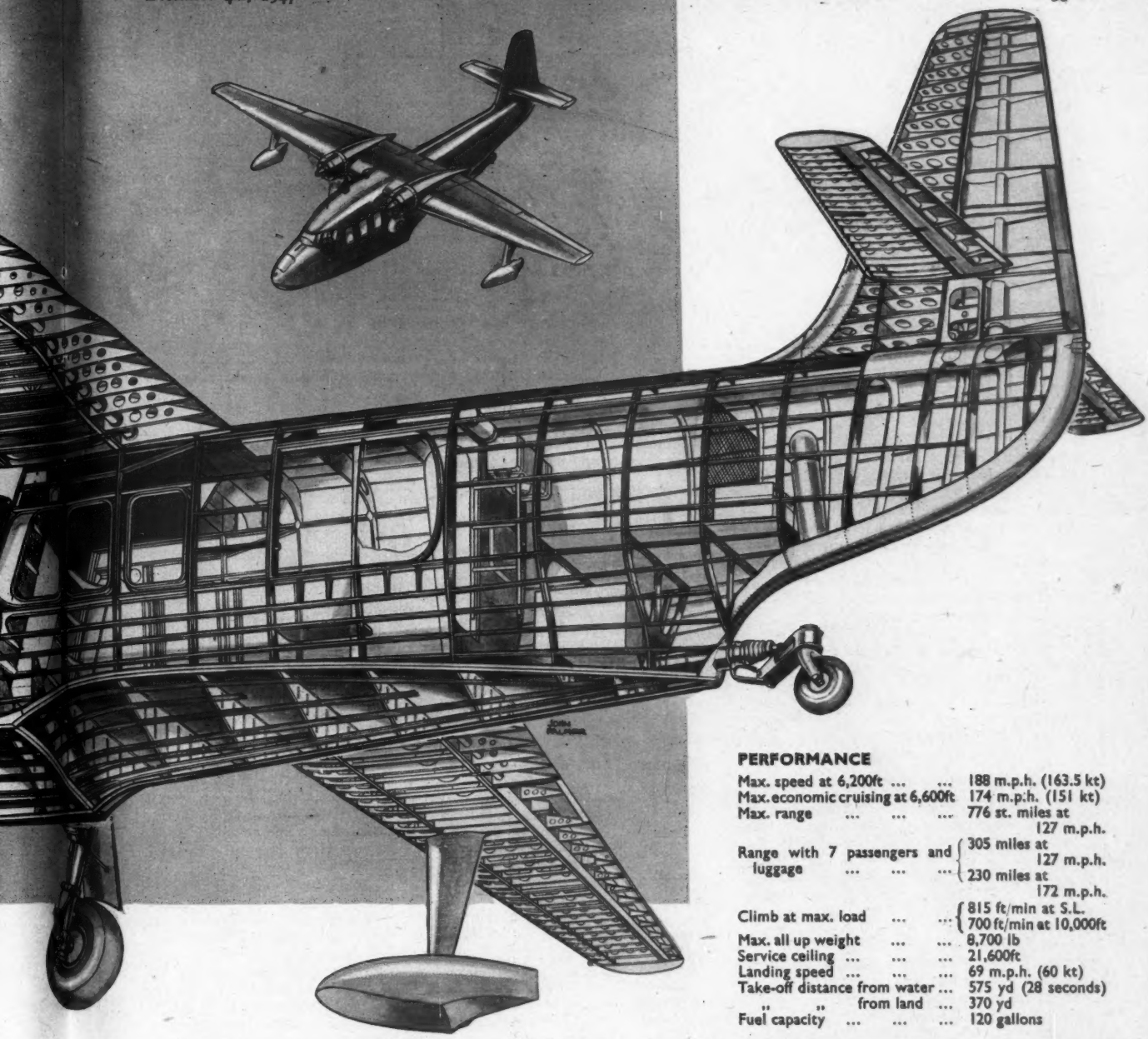
Hull design was logically the work of the Rochester staff, while the wings were designed at Belfast. Lofting was done at Rochester and, using the Robinson reproduction process, prints were sent to Belfast. The so-called "extension factory" at Belfast will later have its own machine shops, but for the prototype Sealand all machining has been done in the main Belfast factory.

An investigation of the probable market, and the encouragement afforded by actual enquiries, led to the building of the Sealand. The engines of the prototype and some production machines will be Gipsy Queen 70s, supercharged and geared units of 330 h.p. output, fitted with D.H. reversible pitch airscrews. Another mark of Sealand is expected to have 515 h.p. Alvis Leonides engines. The change of power unit will be accompanied by a small increase in span, a wider centre section being incorporated to give tip clearance for the larger airscrews. The considerable increase in power will naturally give better general and single-engined performance, and, what will be of more importance, an improved take-off and climb for operation from water at high altitude or restricted in area, and from mountainous country.

As indicated in the illustrations and g.a. drawings, the Sealand is a twin-engined, high-wing amphibian flying boat. Both leading and trailing edges of the outer wings taper towards the tips, while the centre section is rectangular and carries the two engines above and forward of the leading edge. The under surfaces and the centre section are uninterrupted by the nacelles. The construction is all of metal, and a roomy and comfortable two-part cabin with large windows can be equipped to carry five or, if required, eight passengers. Provision is made for a toilet in the five-seat version, and there is a baggage compartment behind the cabin in addition to racks above the seats for small luggage. Smoking is permitted and ash-trays are provided.

Good Cockpit Layout

Particular attention has been paid to the layout of the pilot's cockpit, from which there is exceptionally good view. The neat and practical grouping of the instruments and the controls, some in the roof, is shown in our illustration. All the controls can be locked by the movement of one lever on the cable block at the top of the cabin



PERFORMANCE

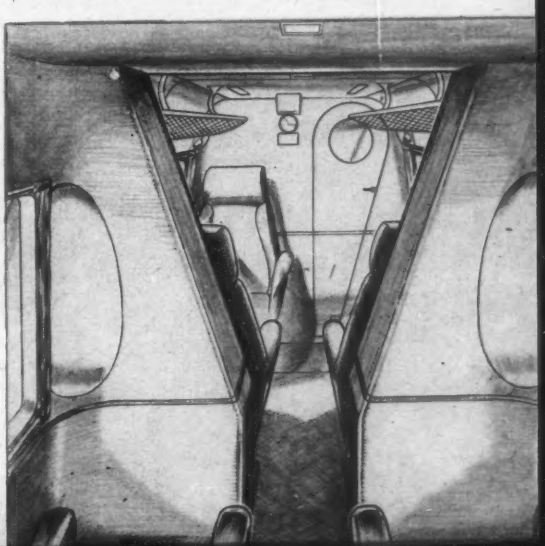
Max. speed at 6,200ft	188 m.p.h. (163.5 kt)
Max. economic cruising at 6,600ft	174 m.p.h. (151 kt)
Max. range	776 st. miles at 127 m.p.h.
Range with 7 passengers and luggage	305 miles at 127 m.p.h. 230 miles at 172 m.p.h.
Climb at max. load	815 ft/min at S.L. 700 ft/min at 10,000ft
Max. all up weight	8,700 lb
Service ceiling	21,600ft
Landing speed	69 m.p.h. (60 kt)
Take-off distance from water ...	575 yd (28 seconds)
,, ,, from land ...	370 yd
Fuel capacity	120 gallons

rear wall. Control cables pass up the rear wall of the cockpit, and those for the tail surfaces are accessible through inspection panels in a duct on top of the hull as they continue rearwards. All servicing is carried on from the outside, a feature which is of even greater importance in a flying boat than in a landplane.

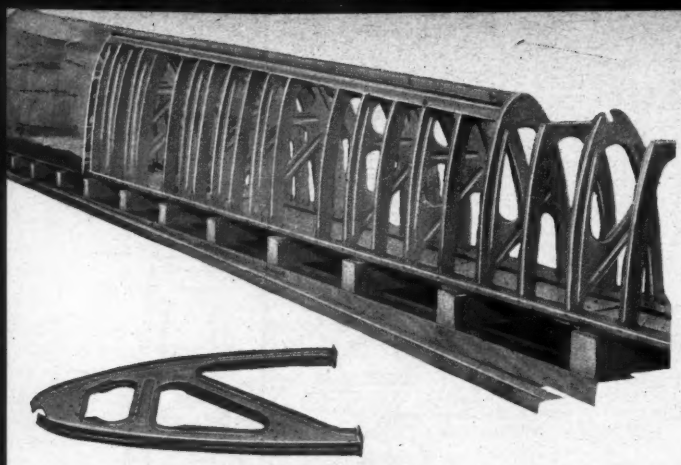
The pilot himself can carry out the initial mooring operations from the cockpit with the aid of a boat hook attached to the aircraft. When the hook has been engaged in the strop on the buoy, the window on the starboard side is moved right back and a small folding door is opened. It is then quite easy to get out on to the step provided just above the water-line, open the nose hatch and get into it in order to make the aircraft fast to the mooring bollard.

Convenience and comfort have been carefully studied, ventilation and heating in particular. Fresh air enters through inlets in the leading edge of the wings and is ducted to individual control louvres above each seat in the cockpit. A separate system provides hot air from exhaust manifold muffs, and the third system of ducts and grills is in the form of an extractor in the roof of the cabin.

The Sealand can be supplied



Large windows, comfortable chairs and a spacious cabin, together with the high-wing layout, will make the Sealand a very desirable aircraft.



(Left) Structure of the nose portion of the outer wing. Note the channels for the T.K.S. de-icing strips and the fluting for stiffening on alternate ribs. (Inset) Two similar ribs riveted back to back are used at the inboard end.

On retracting the landing wheels the tail wheel turns through 180 deg. about its horizontal leg. The lever linkage with the pneumatic ram is enlarged to indicate its operation.

SHORT SEALAND . . .

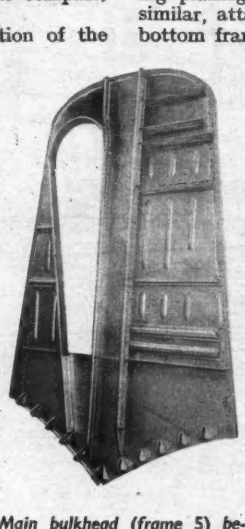
with or without a de-icing system, but if fitted, T.K.S. porous strips are located in the leading edges of the wings, tailplane and fin, and the fluid storage tank is placed in the rear baggage compartment. The complete weight of the system is 150 lb. Provision is made for the carriage of full radio equipment and, if desired, a radio compass, but these items are extras.

There is much of interest in the construction of the Sealand, and a similarity between it and other recent Short designs is apparent. In particular, extensive use is made of pressings, and stiffening is achieved by generous use of fluting, often in alternate directions, and of flanged and swage-rimmed lightening holes and cut-outs.

Main units comprising the airframe are a forward or main hull section (back to frame 20); a tail section; and a centre and two outer wing sections. Tail surfaces, wing tips, control surfaces, leading edges and floats are sub-divisions of these main units. The floats are of the Shetland type and have a buoyancy of 770 lb.

The Hull

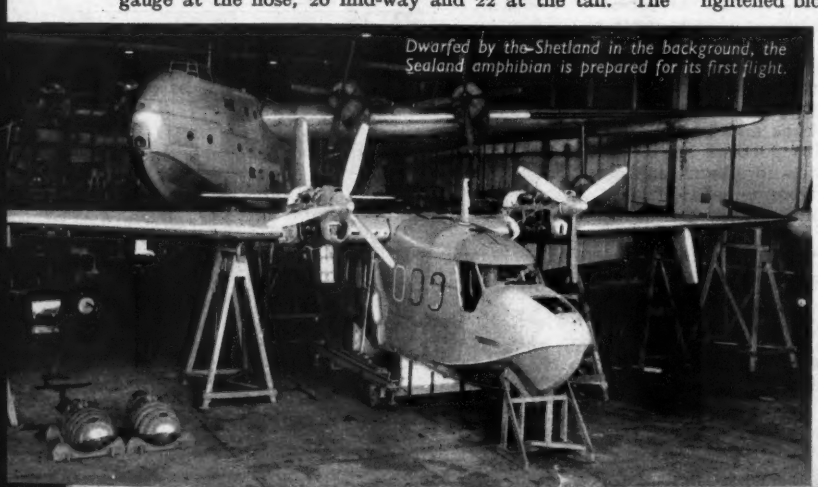
It is best to consider the construction of the hull in sections. The planing bottom is built round a framework of pressed ribs or frames with alternate fore and aft flutes for stiffening. The top edges are angled for attachment of the flooring, and in the case of the main frames (pressure frames) an angle extrusion is riveted to the bottom profile. Fore-and-aft stiffeners, of top-hat section, are attached by channel brackets, called outrigger brackets, to the frames. They pass between frames and skin. It has been pointed out that a great simplification with little increase in weight could be achieved by standardising the brackets. On the prototype there are some twenty different types. Alclad skin completes the construction of the planing bottom, 18 gauge at the nose, 20 mid-way and 22 at the tail. The wide keel strip and the chine angles, flush riveted to the main skin, are 16 and 20 gauge and 16 and 18 gauge front and rear respectively. Frames 2a, 5, 9, and 16 form watertight bulkheads, while frames 5 and 16 mark the front and rear walls of the cabin.



Main bulkhead (frame 5) between cockpit and cabin, with aperture for door. Note the flutes for stiffening.

Hull side frames are of two principal types: main and intermediate. The main ones are channel sections flared out at the lower ends for attachment to the corresponding planing-bottom frames. Intermediate frames, rather similar, attach to short side projections from the planing-bottom frames. Skin stiffeners or stringers of figure 2 or "bulb-angle" section pass, fore and aft through cut-outs in the frames, and are riveted to the skin only. The frames are tied by a single channel-section longeron on each side, positioned at the junction of the sides with the roofing. Roof frames are flanged and riveted to the top skin. A duct containing control cables, wiring, etc., passes spinally down the length of the fuselage, and the roof frames also have large flanged cut-outs to carry air ducts for cabin ventilation and wiring for internal lights. Features of the side and keel frames are the single deep flutes and cut-outs stiffened locally by doubling plates.

The two landing wheels and their massive rearward-sloping boxes may be considered separately from the hull, although the boxes, in fact, replace number 9 and 10 side frames. The boxes, as may be seen in the drawing, have as a basis extruded angle and 16-gauge sheet, with large 8- and 10-gauge doublers added as required around the undercarriage mountings. Each of the wheels folds about two large bolts carried in welded steel boxes and what are called spool fittings. These fittings are large, flanged collars passing through and bolted to the layers of sheet. At the top ends, the undercarriage boxes are bolted to the wing spars, the chief attachment being to the machined extruded booms of the front main wing spar with the aid of two large vertical bolts. The outer bolts also pass through the channel longerons on each side, and are secured through large lightened blocks which are themselves bolted to the undercarriage boxes.



Dwarfed by the Shetland in the background, the Sealand amphibian is prepared for its first flight.

Three-piece Wing

Over the wheels and their housings there is a large cut-out in the hull into which is dropped the wing centre section. The structure of the centre section comprises a main spar, a subsidiary rear spar and a false front spar tied by ribs of varied construction. The lower surface inboard of the engine is skinned normally, but the upper surface is covered by large and small detachable panels giving access to the two tank bays, to the engine and flying controls, plumbing for engines and de-icing and the main pneumatic junction. The panels are "waffle" pressings to which are attached plain outer skins.

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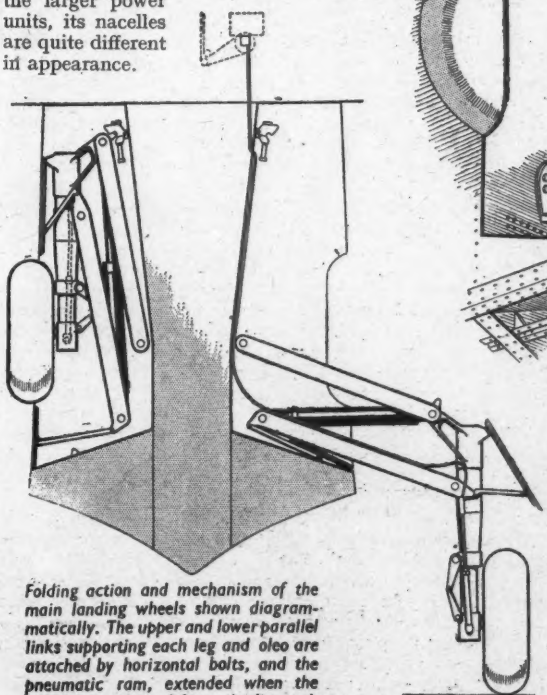
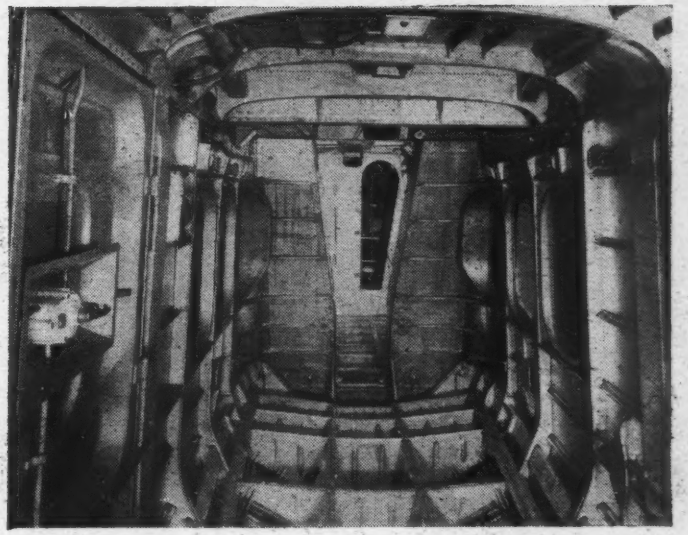
For both outer wings and centre section the front spar is made up of machined angle extrusions with stiffened sheet web. The rear spar is build up from sheet web and inward-facing angles, and the two spars, together with their drag members, form a box. The short false spar of the centre section matches up with the front vertical face of the hull cut-out and incidentally carries a water seal for the cabin roof. Between the hull and engines it also carries pressed nose ribs, cut out and flanged. Cut-out intermediate ribs stretch between the main and false front spars, and the main spar is stiffened at its front face by angle and top-hat uprights.

Engines and Nacelles

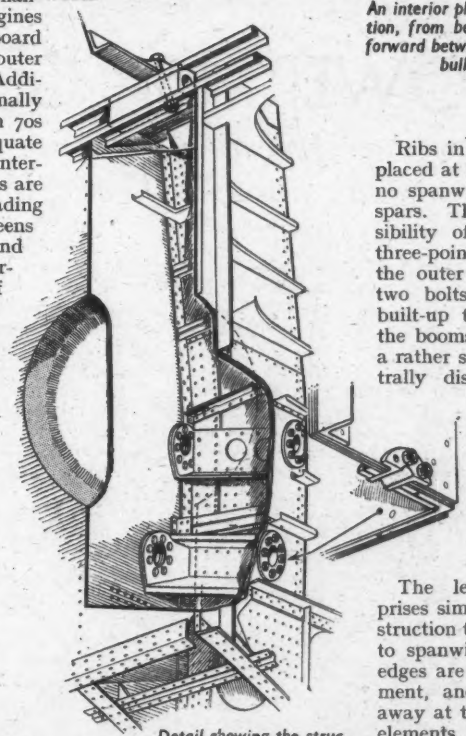
Behind the power units, which are supplied complete by the manufacturers and resemble those produced for the Dove, are two main ribs which may be regarded as a continuation of the engine mountings between spars. They are made up of lipped channel sections placed back to back and cross-braced by single-lipped channels. In the inter-spar bays behind the engines are located two flat jacks operating the inboard flaps, which are in turn linked to the outer flaps, and a Graviner fire extinguisher. Additional tubular bracing members run diagonally between ribs and spar. The Gipsy Queen 70s are mounted high in the wings to give adequate water clearance, while to permit complete interchangeability of power units the air intakes are arranged asymmetrically in the wing leading edges on the port sides. The Gipsy Queens carry 3/1,000/2 three-bladed de Havilland constant-speed, feathering, reversing airscrews, 8ft 3in in diameter. A drawing of the Leonides-engined Sealand appears on page 635. Due to the increased centre section span and the circular section of the larger power units, its nacelles are quite different in appearance.



Folding action and mechanism of the main landing wheels shown diagrammatically. The upper and lower parallel links supporting each leg and oleo are attached by horizontal bolts, and the pneumatic ram, extended when the wheels are retracted, forms the diagonal.



An interior photograph taken during construction, from beside the entrance door, looking forward between the wheel boxes to the front bulkhead and pilot's door.



Detail showing the structure of the main undercarriage boxes. These are fabricated from light alloy extrusions and heavy gauge sheet, but the two bearing bolts are carried in small welded - steel structures.

Outer Wings

Ribs in the outer wing sections are placed at five-inch pitch and there are no spanwise members other than the spars. This does away with any possibility of quilting in the skin. A three-point attachment is employed for the outer wings. At the main spar two bolts pass horizontally through built-up tongue and fork fittings on the booms, while the rear joint, with a rather similar type of fitting, is centrally disposed on the spar. The ribs are pressings, either cut out and flanged or with swage-rimmed lightening holes interspaced by diagonal flutes. In all there are 25 main ribs and 24 intermediate members in each of the outer wings.

The leading-edge structure comprises simple nose ribs of similar construction to the interspar ribs, attached to spanwise made-up channels. The edges are flanged for the skin attachment, and intermediate ribs are cut away at the nose, the T.K.S. de-icing elements being slotted into alternate main ribs. The nose "boxes" are located by spigots which take shear loads and are attached by riveting a skin overlap from the main sections of the outer wings to the spanwise channels. A single bolt and a pair of key holes serve to attach the wing-tip units.

All control surfaces, including flaps, are fabric covered and have pressed sheet ribs as in the main airframe structure. The fixed tail surfaces, each of which has a three-point attachment, are quickly removable and port and starboard tailplanes are interchangeable. The flaps are made in four sections, connected in pairs, and are hinged at the wing lower surface. A shroud is provided above the flap and aileron noses, but no trailing edge as such.

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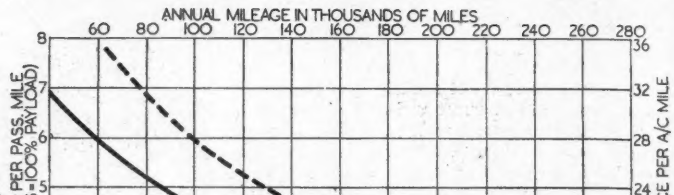
Drawings on the previous page enable the geometry of the landing gear to be studied. Briefly, pneumatic jacks form the diagonals of a parallelogram produced by the oleo legs, upper and lower links, and mountings. When fully extended, i.e., with diagonals at their maximum length, the wheels are retracted. The tail wheel, supported in two bearings housed in a large casting at the rear end of the keel, is caused to revolve through 180 degrees by the action of a small pneumatic jack and a lever link. The mechanism is all internal and there is no water rudder as the engines are to be fitted with reversible-pitch airscrews.

Fuel is carried in two 60-gallon tanks in the wing centre section and fed to the engines by immersion pumps. The tanks, of Short design and construction, are made from soft aluminium shells with pressed baffles, flanged and fluted, the whole being assembled by welding. Smith's electric contents gauges are fitted.

Great care has been taken to avoid the possibility of corrosion by salt or fresh water, and this is one example of how the Short Companies' great experience with flying boats, military and civil, has been usefully applied to the Sealand. Mention was made in *Flight* dated November 27th of a pure flying boat version and of the facility with which the wheels can be detached from the amphibian to increase payload when operating from water.


ANNUAL MILEAGE IN THOUSANDS OF MILES
60 80 100 120 140 160 180 200 220 240 260 280
COST IN PENCE PER PASS. MILE (16 PASSENGERS + 100% PAYLOAD)
8 7 6 5 4 3 2
COST IN PENCE PER A/C MILE
36 32 28 24 20 16
AIRCRAFT
PASSENGER
428 571 714 857 1000 1143 1286 1429 1571 1714 1857 2000
ANNUAL HOURS TO THE NEAREST HOUR

Estimated representative operating costs for the Sealand amphibian. All known factors—prime costs, annual costs and running costs—have been considered.

POWER for GLIDERS

Some Suggestions and Details Concerning a Detachable Lightweight Power Unit

IN pre-world-war days certain countries became associated with particular forms of private flying. At one time the Germans were the chief exponents of gliding and soaring, and France took particular interest in the ultra-light designs immortalized by the Pou du Ciel. In this country we did not specialize in any particular type, but were keenly interested in all of them. Generally speaking, American private owners have been able to think in terms of rather faster and more powerful aircraft than we have, the main reasons being that costs could be less due to the relatively large market, the cheapness of fuel and the higher utilization resulting from better flying weather and greater distances to cover.

Since the war an increasing interest has, however, been taken in gliders aud ultra-light aircraft in America. It is perhaps somewhat surprising to find Mr. E. H. Rowley, Chief of the Flight Test section of the Boeing Airplane Company, producers of the Flying Fortress, Superfortress and Stratocruiser, actively interested in power for gliders. However, earlier this year he prepared a short paper for the S.A.E. National Personal Aircraft Meeting, outlining the requirements and giving some details of work with which he was closely associated.

In introduction he stated that "the art of soaring has long suffered from the amount of muscle that must be expended" in order to fly. The preliminaries of a typical soaring operation consisted of (1) obtaining a field; (2) taking a glider to it; (3) assembling the glider; (4) setting up the winch or getting the towplane ready; (5) getting the winch operator or pilot for the towplane; (6) arranging for the rope to be retrieved; (7) getting men for the wingtip; (8) laying out the launching rope.

Mr. Rowley said that "by injecting a little gasoline into this picture" nearly all of these trying factors could be eliminated. It was therefore thought that if a glider propulsion unit was developed and accepted, the sport of soaring could be greatly expanded and a sailplane owner could, if he wished, operate from a regular airfield. Powered gliders were not new, but no successful development had been accomplished until the advent of the Nelson Dragonfly. This machine, and the particular design which was under discussion, were started at about the same time, but while the one was built for sale as a complete aircraft with propulsion unit, the other's approach was to develop a power unit that could be to attached and detached as an outboard motor would be to a boat, thereby making it available to existing sailplanes. Problems with the Civil Aeronautics Administration were considerable, but they had been very helpful in the development of the Dragonfly, and appeared to be receptive in their attitude towards the detachable unit.

Several variants of the design were possible, but the important feature was a reliable four-stroke power unit. No such engine design was available, but there was an increasing demand both for use as a detachable unit and for buried installation. As an instance was quoted the case of the Schweizer Brothers, who are anxious to develop a unit suitable for the many gliders they now have in service.

The author then proceeded to list the basic requirements of his proposed power unit. (1) Sufficient power to give a take-off distance of not more than 500ft and an initial climb of not less than 300ft/min. (2) A hand starter that could be used in flight in a similar manner to that employed for outboard motors on boats. (3) A propeller arrangement that would give a minimum of drag when the engine was stopped in flight. (4) A fuel capacity for at least one hour at cruising power. (5) A landing gear for the glider, giving satisfactory ground handling, that would not appreciably increase drag or weight. (6) The complete power unit to be as integral as possible with attachment and detachment device to make it possible to fly without the power unit when desired.

Weight per Horsepower

Design requirements of the power plant were 22 h.p. output for a dry weight of 45 lb exclusive of pedestal, drive shaft, etc. After consideration an opposed-twin four-stroke unit of 43.9 cu in capacity and a bore and stroke of $3\frac{3}{16}$in and $2\frac{3}{4}$in respectively was selected. The opposed arrangement offered advantages in connection with size reduction and future application as a buried installation. Other details settled were an engine speed of 4,500 r.p.m., a reduction gear of 2 to 1 ratio, side valves, and a compression

Power for Gliders . . . . .

ratio of 6.8 necessitating the use of 90 octane fuel. The experimental installation for which cooling set something of a problem was a completely cowled pusher.

Mr. Rowley said that after thorough investigation the propeller finally settled upon was a two-bladed, automatically folding type consisting of conventional wood blades and a steel hub housing the folding and damping mechanisms. The design of this propeller set several problems, and it was found that the critical conditions of operation occurred during the latter portion of the unfolding process. The pusher installation proved to have the advantage that the folding process when the engine was stopped was greatly assisted by air loads. Provision had previously been made for a fly wheel for the engine for use during starting and warming up while the propeller remained folded. The total weight of the completed 54in propeller was 7½ lb, and the aim of zero propeller drag when the engine was stopped had definitely been accomplished.

Turning to a description of the installation, the author said that the supporting pedestal between the engine and its reduction gear unit was a sheet dural monocoque with provision for the housing of the fuel tank. The pedestal was mounted rigidly to the crankcase at the lower end, and the gear box mountings at the top end. The engine unit was mounted on a small tubular structure attached through shock mountings to the structure of the aircraft. The drive shaft between engine and gear box incorporated a torsion damper. The cowling and firewall around the engine were readily detachable and the engine and its four attachment pins were completely accessible on removal of the cowling. The whole installation less the fillet and cowling comprised a single unit easily handled by one person, and the only connections with the airframe was detachable throttle and starter cable.

In conclusion, the total weight of the complete unit with fuel and oil was given as 80 lb. Some comparative figures for performance and weight between the glider with and without a power unit were as follows:—

	Without Engine	With Engine
Normal gross weight	530 lb	610 lb
Wing loading	3.18 lb/sq ft	3.59 lb/sq ft
Minimum sink	2.8 ft/sec	3.2 ft/sec
Gliding ratio	19:1	18:1
Stalling speed	28 m.p.h.	32 m.p.h.

BOOK REVIEW

Introduction to Aeronautics. By C. F. Toms, A.R.Ae.S. 404 pp. Published by Charles Griffin and Co., Ltd., 40s.

THE reviewer has only one serious quarrel with this book—its title, which is a complete misnomer. Just why the author, who is a member of the Bristol design staff and obviously a highly competent technician, should modestly label a thoroughly adult book on aerodynamic design computations with its present misleading title, is not known. He suggests that Mr. Toms does himself less than justice, and would be well advised in future editions to change his title to something more like "Design Aerodynamics," since the contents are clearly intended for the ambitious young draughtsman and technician who wishes to know "what makes the machine tick"; in other words, the basic concepts of applied aerodynamics and the ability to perform practical design calculations within that sphere.

The author, in fact, has attempted—with considerable success—to cover much the same ground as that presented in Diehl's well-known American text on "Engineering Aerodynamics." The latter work has rightly become a standard classic in American design offices, but since the last edition was of 1936 vintage, it is now a trifle *démodé* in view of wartime development. Thus, one might have expected that a post-war book in this field would have covered the treatment of turbo-prop and turbo-jet performance analysis, but, in this respect, Mr. Toms is no better than Diehl some ten years earlier. Oddly enough, however, the author throws in a final chapter on Rotating-Wing Aircraft, which might well have been left to the qualified expert to expand into a more complete text on helicopter aerodynamics.

Some idea of the actual contents may be judged from the chapter headings, as follows: (1) Basic Aerodynamic Concepts. (2) Power Unit. (3) Drag and Performance. (4) Flaps, Take-off and Landing. (5) Control and Stability. (6) Wind-Tunnel and Flight Testing. (7) Load and Pressure Distribution. (8) Rotating-Wing Aircraft. Each chapter has a companion appendix at the end of the book, the idea being to present only the more pertinent design data in the chapters, leaving the proofs of formulae and such-like additional matter to be further expounded in the appendices. The author is to be congratulated on this workmanlike arrangement, since it avoids cluttering up the working text when in practical use in the design office. However, it will annoy those schoolmen who delight in mathematical rigor *per se*, rather than design utility for the man on the job. In which it reminds us again of Diehl.

One of the things one particularly likes about this book is the abundant use of illustrative examples freely worked out on some component of a typical twin-engined monoplane, which is taken as the main exhibit or foundation, so to speak, upon which to erect a coherent knowledge of the whole. Thus, geometric and aerodynamic properties (dimensions, lift, drag performance, control, stability, etc.) are knit together with a certain continuity from chapter to chapter. This, again, is contrary to all academic concepts of "higher learning," but there is no better way in which to drive home practical design aerodynamics to the young student or designer working on the job—and the job is always a whole lot different from the college classroom.

Furthermore, this is the first aerodynamics text in which one recalls seeing a dynamic stability phugoid oscillation exemplified by a fully worked out and tabulated analysis. (A good many such texts give the usual qualitative treatment, but carefully shy away from quantitative values, thereby leaving the average engineering student in a mental fog.) Another excellent illustrative example is the author's full-dress treatment of wing load distribution curves by the classic Fourier series analysis of Lotz; indeed, this particular chapter on Load and Pressure Distribution is almost worth the price of the book because, although this subject is the vital connecting link between the aerodynamist and the stress analyst, it is generally avoided like the plague by both groups of textbook writers! But is the author aware that much simpler computational methods are now available? More recent N.A.C.A. methods have boiled this type of load analysis down to simple arithmetical interpolation, and—when considered in the light of the original aerodynamic assumptions—the final results are fully as accurate as those obtained by the Lotz method.

Finally, from the printing and format viewpoint, this book is fairly well tailored—considering these austerity times. One could still wish, however, that English technicians knew how to draw a curve that hits the optic nerve; that is, accuracy infiltrated with artistry, dare one say? And the first fundamental is that the curve itself should be *at least* three times the weight of the surrounding grid—not an attenuated hair-line lost to view therein. Moreover, all graphs should be properly framed just like any worth-while canvas—not left hanging on an isolated X-Y horizontal-cum-vertical cross-bar. But enough of art in the midst of science. S. H. E.

WHERE'S THAT FIRE?

DURING the past two years the Department of Lands and Forests in Ontario, Canada, has been successfully experimenting with a new method of fire drenching by means of water sprayed from aircraft floats. The aircraft used for these experiments was a Norseman. Although not intended to cope with major fires, this method has been found capable of quenchings small fires and damping down the paths of larger ones, and has also been applied to insect spraying and restocking of lakes with fish. The water is admitted to the carrying compartments in the floats when the aircraft is at rest or taxying slowly, and one of the keys to success is the efficiency of the valves, four per float, which both admit and release the water. The type in use are known as the Crossley Step Set Drench Valves.

FORTHCOMING EVENTS

Dec. 4th.—Royal Aeronautical Society: "Problems Facing Civil Airline Operators." N. E. Rowe, C.B.E., B.Sc., D.I.C., F.R.Ae.S.

Dec. 4th.—Helicopter Association of Great Britain: "Some Aerodynamic Problems of the Helicopter." H. B. Squire.

Dec. 7th.—Royal Institution of Gt. Britain: "The Advent of the Aircraft Gas Turbine." A. Cdre. F. Whittle, C.B.E., M.A., F.R.Ae.S., Hon. M.I.Mech.E.

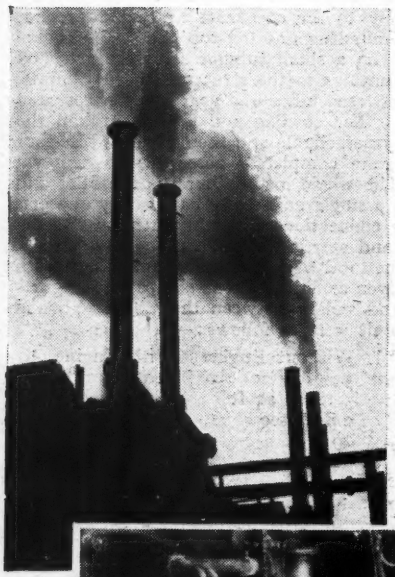
Dec. 9th.—R.Ae.S. (Belfast). Lecture by Sir John Buchanan, C.B.E., F.R.Ae.S., A.M.I.Mech.E.

ROUND the ROLLS-ROYCE

"Flight's" Camera Makes a Tour of the Famous Factory

THE name of Rolls-Royce has become accepted the world over as the hall mark of perfect workmanship. A walk through the shops confirms the accuracy of this, and confounds the critics who suggest that Britain no longer holds the secret of super-excellent workmanship.

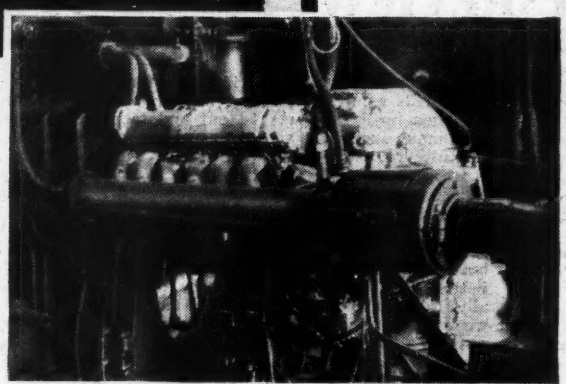
Whether one is in the erecting shop, foundry, test houses, inspection, machine shop or any other department there is a sense of skill allied to artistry. It is here that the designs which emanate from drawing office and experimental departments come to life and eventually go forth to all parts of the globe with that intangible "something" about them, which bears not only the mark of one factory but also that of the nation.



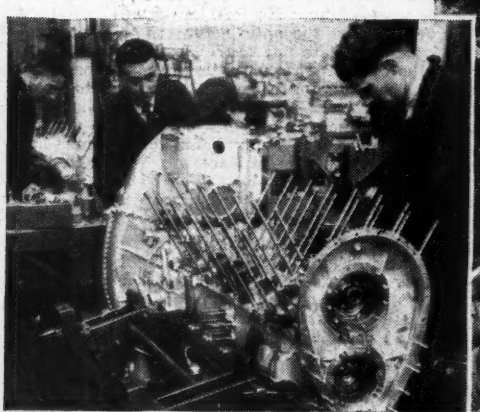
Steam from the engine test beds gives a true picture of the busy Derby factory. The steam is from water sprayed into each silencer to suppress noise and cool exhaust gases.

(Above) Building power eggs. Cutting out the access door in a panel destined for a D.C.4 M of Trans-Canada Airlines.

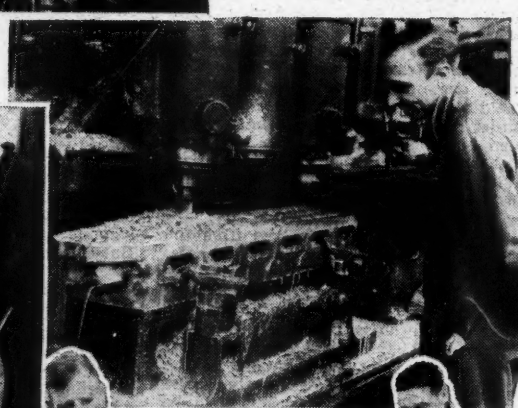
(Below) Rough milling the rocker bracket pads on a Griffon cylinder head.

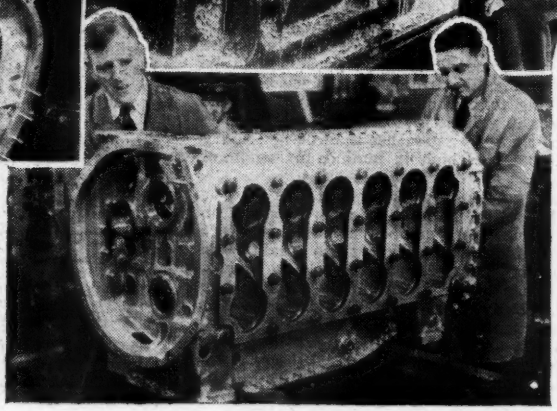


A Rolls-Royce Merlin of the civil 620 series undergoing a clearance run before despatch.



(Above) In the aero engine erecting shop which has a special air conditioning plant to eliminate dust.





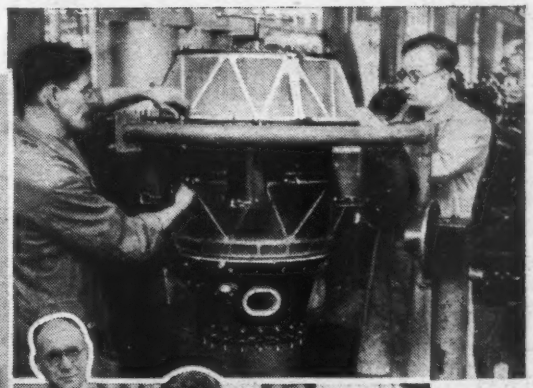
(Right) Engine unit assembly. Checking the clearance for the two crankshafts of a 3,500 h.p. Eagle engine.

(Centre) Putting the finishing touches to a sand core for Derwent blower casing.

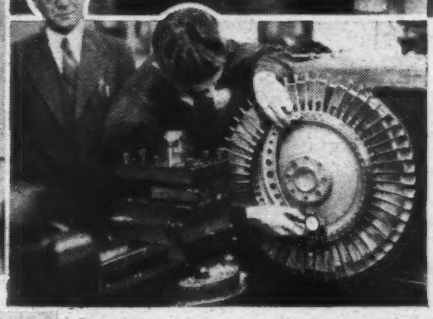
ROLE SHOPS

Fam[ous] factory at Derby

Mr. H. J. Swift, O.B.E., General Manager of Aero Production, superintends the setting up of an hydraulic broach for cutting "fir tree" serrations on a turbine disc.



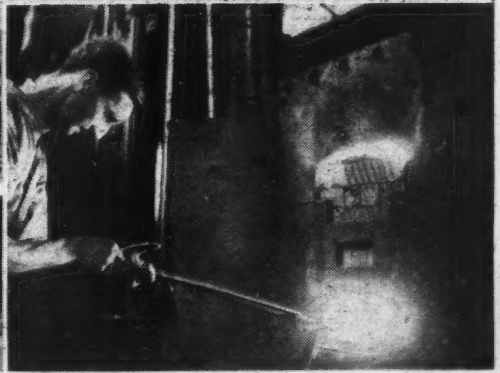
(Top Right) A Derwent V jet propulsion unit being erected in the jet engine assembly line.



(Below) Double-pouring molten metal — to Rolls-Royce formula — into the mould of a Merlin crankcase. Temperature of the metal is exactly 740 deg. C.

Mr. Ashford, Assistant Superintendent, Machine Shop, watches the measuring of a labyrinth seal on a Nene turbine wheel after machining.

Checking the outside diameter of con-rod bushes by a "Sigma" measuring machine which gives a visual check to 1/10,000 part of an inch.

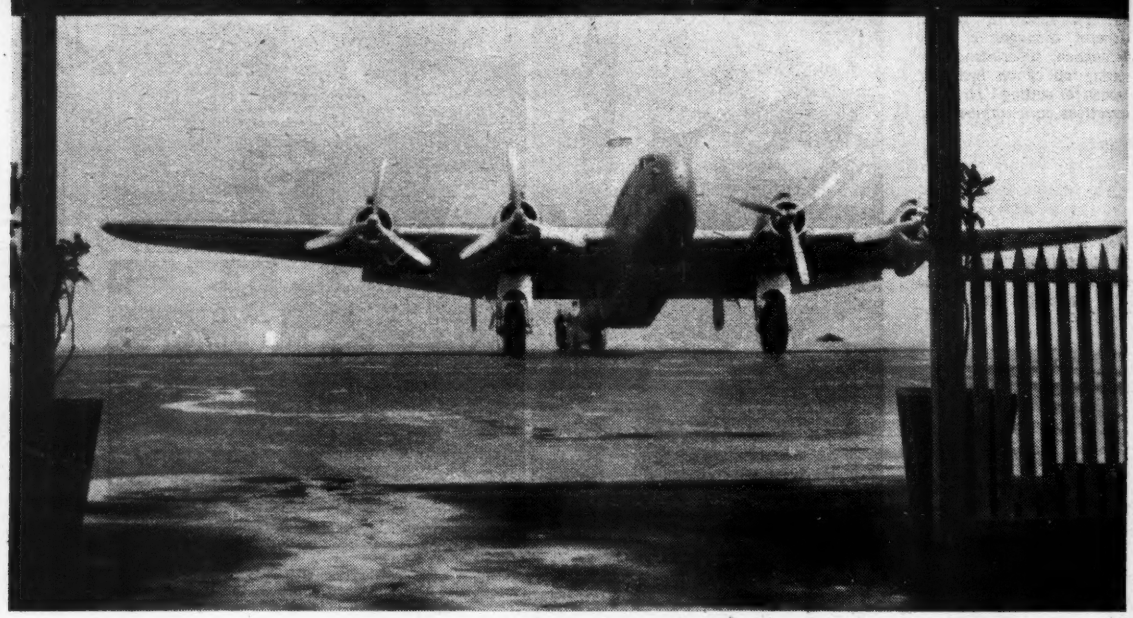


...ressing with protective paint ...sand core for a Merlin ...rankcase. Six of these are ...quired for each engine.

In the foundry. An aero-engine valve being taken from the furnace to have the head stamped to shape. The upper chamber of the furnace is 900 deg. C. and the lower 1,050 deg. C.

(Right) Testing a connecting rod for surface flaws. The rod is magnetized and immersed in a bath containing iron filings.

CIVIL AVIATION NEWS



After arrival from Lagos on the Trans-Sahara route, a B.O.A.C. Halton is photographed through the passenger reception building at Accra. The new West African Airways services link with this trunk line service to the U.K.

I.C.A.O. Attempt at Multilateral Agreement Fails : Fire Destroys Two Aircraft : Dr. Warner Visits London

DISAGREEMENT AT GENEVA

FOLLOWING a resolution passed at the P.I.C.A.O. meeting last May that a Commission should be set up by October, 1947, to draft an agreement respecting the exchange of commercial rights in civil air transport, 28 member states met at Geneva last month to discuss the terms of a multilateral agreement. It is understood that the discussions centred around the question of automatic inclusion of fifth freedom rights in a multilateral agreement. Britain, America and France supported this, but other states wished to include in any such agreement automatic third and fourth freedom rights only, and to reserve the right for each member to include fifth freedom by bilateral agreement. It was agreed by all that third and fourth freedoms should not be refused by any country. (As a reminder, third and fourth freedoms limit the traffic carried to that which is destined for or being carried within the country of the airline concerned. Fifth freedom rights allow an airline to carry traffic into and out of countries other than that of its origin and through which it passes whilst flying on accepted trunk routes.) The delegates were generally agreed that it was impossible to draft a multilateral agreement at this stage, and that countries would have to continue with the practice of making bilateral agreements. The meeting ended on November 26th, and the matter now remains in abeyance until the next general meeting of I.C.A.O. is held.

B.O.A.C. LEAVE FILTON

AT a dinner in Bristol on December 1st, B.O.A.C. paid tribute to the hospitality shown by the city during the war. It was easy to detect in the speeches that the Corporation was leaving Bristol only temporarily, and that only ministerial faction prevented B.O.A.C. from announcing the re-establishment of a base in the west, in fact at Filton, as a maintenance base for the Atlantic division.

Mr. Whitney Straight referred to the invasion of Bristol by the airline in September, 1939, after which, with headquarters at Bristol, 57 million miles were flown and 50 million pounds of cargo was carried in unarmed aircraft flying all over the world up to the end of the European war. In reply to Mr. Verdon-Smith, who proposed B.O.A.C., he paid tribute to the personnel of the Corporation with whom he had become acquainted in his five years of office.

Although the Canadians had given every help, he said, and shown extreme hospitality at Dorval, the Corporation were convinced that it was necessary that the Atlantic division should be based in this country, and Filton was ideal.

The official announcement may be made before our next publication, but at present there appears to be a hold-up in making a decision by the Ministry of Civil Aviation, which is preventing B.O.A.C. from making a move in this country.

FAIREY ACQUISITION IN CANADA

THE Air Survey Co., one of the Fairey group of companies, has acquired Aero Surveys, Ltd., British Columbia, Canada, which is under the technical direction of Dr. Lyle Trorey. Aero Surveys is in close liaison with another recently acquired company, Aerographic Surveys, Ltd., Weybridge. The directors of Aerographic Surveys are G/C. F. C. V. Laws, John G. Macpherson, Sir Clinton Lewis, Richard Fairey, Dr. Lyle Trorey and Norman A. Borter.

TWO AIRCRAFT DESTROYED

A REPORT has recently come to us from Khartoum of an accident to two aircraft, fortunately not involving any fatalities, which is of unusual interest because of the extraordinary manner in which it was caused, and which calls attention to the peculiar ways in which fires may start.

A flight of three D.H. Rapide aircraft belonging to Air

Civil Aviation News . . . . .

Madagascar landed at Kosti airdrome in the Sudan and refuelled, the usual precautions being taken. The aircraft were then manhandled into wind preparatory to taxying for take-off, and about fifteen minutes after refuelling, two of the aircraft started both engines. After a short delay the third aircraft also started up, and as the pilot bent down in the cockpit the pilots of both the other aircraft saw a fire commence under the port wing and rapidly envelop the whole aircraft. Mr. J. Commenge, the leader of the flight, actually saw the fire start in the grass under the port wing. The pilot of the second aircraft immediately taxied out of range of the fire, and the pilot of the third aircraft, after attempting to give assistance, taxied to a point 180 yards distant from the burning aircraft. He then switched off his engines, but on climbing out of his machine noticed flames in the grass behind the starboard wing. Before he could get it away, however, the aircraft was on fire. Both aircraft were completely destroyed.

An enquiry was carried out the following day by the Civil Secretary's department of the Sudan Government, and the following facts came to light: there were no matches in the first aircraft to catch fire; all four petrol filler caps were secure, and the possibility of petrol having been sprayed from the tank on to the exhaust was ruled out; and no petrol was spilt while refuelling. It was accordingly concluded that the fires were caused by flames from the exhausts igniting the grass, which was very dry and about 18in high, under the aircraft and setting them alight. Subsequent tests, however, showed that it was impossible to ignite the grass with the exhaust, and it is therefore probable that the deciding factor was an unusually hot flame from the exhausts.

LONG-DISTANCE CHARTERS

TWO aircraft of Airwork's home-based charter fleet have returned to this country from East Africa after a total of some 36,000 miles' flying, mainly on Jeddah pilgrimage work. In addition, three flights to the Sudan, for that country's Government leave service, were completed, involving another 20,000 miles. One Viking has been employed in Kuwait by the Kuwait Oil Co., and another has been based at Karachi to work for the Pakistan Government. The home-based fleet, of which the aircraft mentioned form a part, represents just over 10 per cent of the Airwork-owned aircraft.

CANADIAN AIRLINES REVENUE

AIRLINE earnings in Canada are being maintained, but do not appear to be keeping pace with the rise in costs. In July this year receipts from regular airline services totalled $2,057,686 as compared with $2,030,817 in the same month last year, but operating expenses rose from $1,924,653 to $2,106,694 in the same two periods. This reduced the net operating revenue from $106,164 to a debit of $49,008. Non-scheduled operators did better, with a revenue of $617,182, which compared with $182,385 in July, 1946, but the costs increased from $141,533 to $78,841, leaving a net revenue increase from $40,832 to $138,341.

A.R.B. COUNCIL APPOINTMENT

AS briefly reported last week, Mr. Whitney Straight has been appointed to the Air Registration Board as representative of the operators. He was nominated by the Corporations, the British Air Charter Association, the Royal Aero Club and other organizations to fill the vacancy created by the resignation of Lord Knollys from the chairmanship of B.O.A.C. and from the council of the A.R.B. Mr. Whitney Straight, who is, of course, managing director (chief executive) of B.O.A.C., previously served on the A.R.B. from January, 1939, until February, 1942.

CHARTER BRANCH AT SPEKE

MORTON AIR SERVICES, long associated with Croydon Airport, are extending their activities to Speke, Liverpool. From December 15th the company will operate a Consul and a D.H. Rapide from there, and they will later be joined by other aircraft. From Speke, aircraft can be made available for Manchester businessmen, and air ambulances can be operated, to Manchester, to the Isle of Man, Dublin and Belfast in particular. Rates charged are to be 2s 6d a mile in Europe and 3s a mile out of Europe.

DR. WARNER'S BRIEF VISIT

AN important visitor to this country last week was Dr. Edward Warner, president of the council of I.C.A.O. On behalf of His Majesty's Government Lord Nathan, Minister of Civil Aviation, entertained Dr. Warner at a cocktail party at Ariel House, Strand. Dr. Warner had flown from Geneva, was due to fly back to Paris immediately, and had arranged to fly across the Atlantic last week-end. In conversation he told us of his great regret at the failure of the thirty-nation air conference in Geneva, where the divergence of views was too great to be reconciled. Among those invited to meet Dr. Warner were:—

Professor L. Bairstow, Major K. M. Beaumont, A.V-M. D. Bennett, Lord Brabazon, Dr. H. Roxbee Cox, Mr. G. d'Erlanger, Lord Dukeston, Mr. L. Gamage, Sir W. Halcrow, Professor A. A. Hall, Mr. R. E. Hardingham, Sir Harold Hartley, A. Cdre. W. Helmore, Captain J. W. G. James, Mr. Thurstan James, Sir Nelson Johnson, Mr. J. L. Satterthwaite, Mr. G. Geoffrey Smith, Mr. Whitney Straight, Sir Arthur Street, Lord Swinton, Sir Victor Tait, Professor G. Temple, Lord Terrington, Sir Frederick Timms, Mr. L. Vass, Mr. W. R. Verdon-Smith G/C. C. A. B. Wilcock, Mr. P. A. Wills, Mr. J. V. Wood.

INTRASTATE OPERATION CHALLENGED

APPLICATION to the High Court of Australia is being made by Australia National Airways Pty. in an appeal against operation on intrastate services by the Government-owned Trans-Australia Airlines. If the appeal were to be successful, T.A.A. would be limited to the main interstate routes and such a decision would also affect Qantas, Government-owned and running internal services within the State of Queensland. Both the chairman of the National Airlines Commission, Mr. A. W. Coles, and the general manager, Mr. Lester Brain, have announced that T.A.A. is carrying passengers intrastate, so it is the legal position rather than the facts which is the subject of the appeal.

B.E.A. IN BERLIN: An interior view of the B.E.A. booking office and passenger handling point at Berlin, in the Kurfurstendamm, which was opened recently. It was formerly the Winston Club and later a N.A.A.F.I. shop.

PASSENGERS' PREFERENCES

ON the New York to Boston service American Airlines have on occasions loaded Skymasters through the front door and allowed passengers to carry and stow their own luggage. A poll subsequently established that most passengers preferred this scheme, and also loading time was reduced. The experiments were particularly interesting since the company will be re-equipped with Convair 240 aircraft which have been designed for forward loading. Other facts established by poll were that 56 per cent of passengers objected to cigar smoking, 52 per cent to pipes, but only 11 per cent to cigarette smoking and consequently

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the airline is continuing its policy, contrary to the practice of most American operators, of permitting cigarette smoking. The question of whether or not to serve fish on Fridays in aircraft proved that passengers had decided views which varied from route to route!

SIXTH ATLANTIC WEATHER SHIP

THE sixth of the 13 Atlantic weather ships specified by I.C.A.O., the Canadian Navy's frigate *St. Stephen*, sailed from Halifax on November 22nd. The ship will take up station in a zone several hundred miles from the Labrador coast as Weather Station "Baker." This station is the one which is to be manned half the time by Canada and the other half by the U.S.A. Of the other weather stations already in operation, two are maintained by the U.S.A., two by Great Britain and one on a joint basis by Belgium and the Netherlands.

THE NEW INDIAN AIRLINE

LAST week, a new Indian airline, Air-India International, Ltd., was mentioned. It was stated that a Bombay-Cairo service was to be run, and that the airline was to be a joint enterprise between Air India (formerly Tata Airlines) and the Government.

It is now understood that Air India will provide the technical management, the aircrews, all operational and engineering services and will act as booking agents. In this country, Tata, Ltd., 18, Grosvenor Place, London, are the agents. The Government will automatically have control of policy, as the licensing authority for air operations, but in addition the 49 per cent of the issued capital it holds may, by option, be increased to 51 per cent. The present 49 per cent makes the Government, however, the largest shareholder, and it has agreed, if necessary, to grant subsidies in the early stages if operating losses are encountered. Such aid, however, will, if it is given, be repayable from subsequent profits, out of which 50 per cent will be earmarked for this purpose. Until any subsidies have been repaid, the company will be precluded from paying dividends in excess of 5 per cent, and after subsidies are paid off, half of any profits earned in excess of 5 per cent will accrue to the Government, which will, in addition, receive the dividends payable on its shares.

CHARTER FLIGHTS FOR IMMIGRANTS

THERE has been a rapid development of the charter business in Australia. Intercontinental Air Tours are conducting charter flights for immigrants from the U.K. and the Continent, and Trans-Oceanic Airways are engaged on charter flights to bring Greeks from Athens. They have also just completed arrangements for extensive charter work between Hong Kong and Singapore and along the China Coast. A new company, known as European Air Transport Co., has been formed to begin operations on charters between Athens and Sydney to carry the hundreds of Greeks who are endeavouring to reach Australia; it is sponsored by Mr. G. Marcel, an Australian-born Greek. Hudsons and Lodestars purchased from the War Disposals Commission will be used.

BREVITIES

The North Atlantic Communications working group of the International Air Transport Association's technical committee is to institute a system of inter-aircraft communication to provide flying radio-relay stations across the Atlantic, using V.H.F. The service will be used when magnetic disturbances are affecting normal transmission, and will be operated experimentally for six months, commencing on December 15th.

* * *

In 1949 Norwegian Air Lines (D.N.L.) hopes to extend the North Norway route from Harstad up to Svalbard, Spitsbergen, where there is a Norwegian coal company. Two Sandringhams have been in use on the route, a third is ready, and owing to the traffic demand it is stated that a fourth will be needed.

* * *

World Air Freight, 15, Buckingham Palace Gardens, took delivery last week of their first Halifax G-AJNZ which has been overhauled and converted by Airtech, Ltd., of Aylesbury, for freight carrying. This is the first of two to be supplied by Automobile and Aircraft Services, St. James St., London.

* * *

Two tarmac stub runway ends outside the perimeter track at the N.W. and S.E. ends of the 112/292 deg landing strip at Croydon Airport will be open for use from December 1st. The stubs have been laid primarily to assist take-offs. During landings the stubs at the landing end cannot be used, owing to cables, beacons, trees and houses, but stubs at the upwind end may be used for overruns.

* * *

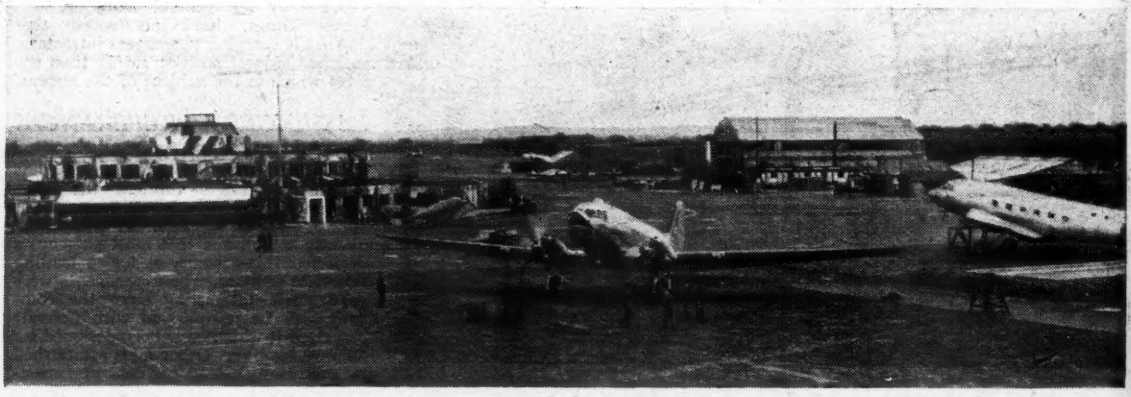
Linea Aerea Nacional, Chile, has received the first of its fleet of Martin 2-0-2s, which is the first overseas delivery of this new type. Two more are to be delivered before Christmas, and the second is to make a goodwill tour of South American cities before it goes into service.

* * *

In answer to a question from Mr. Gandar Dower, the Parliamentary Secretary to the M.C.A. informed the House that the potential traffic in the County of Sutherland was not sufficient to justify an air service. To establish Dornoch as a civil airfield, he said, would involve heavy expenditure on acquisition, development and equipment, which could not be undertaken in present circumstances.

* * *

Last week it was reported in *Flight* that Ansett Airways had refused to implement a 20 per cent fares rise agreed at a conference and had refused a "direction" to do so from the Minister of Civil Aviation on constitutional grounds. The Minister then threatened "further action," which is now developing. A threat to refuse Ansetts the use of Government airfields was made, to which the airline made the counter-threat of an injunction to restrain the Ministry from doing so on the grounds that the Constitution did not permit such



WAR PAINT: The long-term plans for Gatwick have not yet been decided. Meanwhile, the terminal buildings at this Surrey airfield remain in their shabby camouflage and present a derelict appearance. The airport with its excellent rail connections to London is used by many charter companies. Future development will obviously depend upon decisions affecting Croydon, and Gatwick racecourse.

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action. The latest news is that the Minister was considering a fare-cutting war between Ansetts and Trans-Australia, the Government airline, if the refusal of airfield facilities was unsuccessful.

* * *

Twice-weekly services between Paris and Cairo, suspended because of Egypt's cholera outbreak, have been resumed by Air France.

* * *

The five Convairs ordered by Trans-Australia Airlines are now expected early in the New Year. They are costing £490,000.

* * *

Mr. D. H. Handover, A.B.A. director for the U.K. and Eire, has been elected to the Council of the Institute of Transport, to fill the vacancy caused by the election of Mr. S. Kennedy as Hon Treasurer.

* * *

Suspension in production of the Cunliffe-Owen Concordia, announced in *Flight* last week, was decided upon after the cancellation of Concordia orders for B.E.A. by the Ministry of Supply.

* * *

During October B.E.A. carried 44,898 passengers, 472,232 lb of freight and 284,939 lb of mail. Aircraft flew 1,912,414 miles over a route mileage of 13,907, and 5,051 service flights were completed.

* * *

Pakistan has followed India in joining I.C.A.O., with effect from December 10th. The inclusion of both brings the number of member nations up to 45.

* * *

The Airways Terminal at Basrah airport was built by the Iraqi Government in 1936. It was not, as previously described, built by the Persian Government.

* * *

The B.E.A. service between Glasgow and Copenhagen has been discontinued. Four flights a week between London and Copenhagen, two of which continued to Stockholm, also have been operated, but in future the services terminating at Copenhagen will be cancelled, and three London-Copenhagen-Stockholm services will be provided.

* * *

A Visitors' Bureau at 17, Cockspur Street, London, S.W.1, has been opened by Trans-Canada Air Lines. Hotel reservations, excursions and theatre bookings are among the facilities provided.

* * *

The Director-General of Civil Aviation for India is Mr. N. C. Ghosh, whose offices are at the Government Secretariat in New Delhi.

* * *

The resignation of Mr. H. J. Symington, C.M.G., K.C., as President of Trans-Canada Air Lines, was announced last week. Mr. Symington, who has been associated with the company since its inception in 1937, will, however, continue to serve as a director. He was president of T.C.A. from 1941 and in 1945 was elected the first president of I.A.T.A.

Mr. H. J. Symington.

* * *

A freight service between Auckland, Wellington, Christchurch, and Dunedin is to be operated by the New Zealand National Airways Corporation early in the New Year. Temporarily, Dakotas will be used.

* * *

Pan American flew 25,958,311 miles during the third quarter of 1947, an increase of 3,144,957 as compared with the same period in 1946. Passenger-miles for same periods were 502,902,000 and 320,078,234.

* * *

A Plymouth flying boat has made a survey flight between Hong Kong and Haneda, near Tokyo, and three services a week are being operated from December 2nd by Hong-Kong Airways. It is understood that Iwakuri, near Hiroshima, is considered as a base at the Tokyo end of the route.

* * *

Acceptance trials of the prototype Beaver float-plane built by de Havilland Aircraft of Canada, Ltd., were completed on October 27th and an immediate C. of A. is to be issued. Approval of the float-plane has thus been obtained within two months of the first flight of the landplane version.

* * *

Recently, the third and last switching centre of B.E.A.'s teleprinter system came into action at Keyline House, so that any printer station on the Corporation's network can now be connected directly with any other. A "conversation" between Kirkwall, in the Orkneys, and Paris inaugurated the new centre. The network now comprises 3,000 miles of circuit, over which, in August, three million words were transmitted.

FROM THE CLUBS

With the restriction of petrol for private flying and the difficulties which are being encountered by the clubs, it is interesting to note how different is the light aircraft position in America. In spite of the overcrowding of the market, it is expected that 18,000 light aircraft will have been sold in the United States by the end of the year. Mr. Kilenke, general sales manager of the Stinson Division of Consolidated Vultee, said that sales rather than production was now the problem and that it had become clear that business users rather than those who flew for sport would provide the market. Stinsons are providing free flying training, in some cases, before a definite sale is made.

* * *

To maintain interest during the winter months, the Derby Aero Club is arranging a course of lectures and also arranging night-flying facilities. The annual ball on November 28th, one of Derby's most important functions, was expected to stimulate interest in the Club's activities and to provide a good send-off for these and other activities. During the past year the Club's aircraft flew 1,000 hours and paid visits to Le Touquet, Deauville and other places, and a considerable part was played in the organization of the International Air Rally held at Derby Airport in June. On the sporting side, W/C. McDowall and Mr. Wheatcroft won the Tynwald Air Race in the Isle of Man in the latter's Auster, and S/L. Porteous set up class speed records in the Chilton, reconditioned by Air Schools, Ltd.

* * *

A series of lectures on Pilot Navigation and allied subjects, planned by the Weston Aero Club, and given by the Chief Instructor, started on November 14th. In the near future a 16-mm sound projector is to be used. The club, during the past season, obtained 15 "A" licences and 7 renewals, and 15 pupils are still under training. Flying hours totalled 1,106 with the club's fleet consisting of two Austers, a Magister and a Fairchild.

BRISTOL "171": A close-up of the Bristol 4-seater helicopter which first flew on July 24th this year. All parts of the transmission system, including gears and bearings, have been designed for a life of 10,000 running hours.

CORRESPONDENCE

The Editor does not hold himself responsible for the views expressed by correspondents. The names and addresses of the writers not necessarily for publication, must in all cases accompany letters.

WOMEN PILOTS

Equal in Pluck but Not in Efficiency

AS one of your readers referred to by "Aetheris Auidi" (*Flight*, November 20th), may I say that I did not feel presumed upon by the letter of L. Heather, and yet I can claim to be quite intelligent as I have been a reader of *Flight* for some 30 years. But neither can I recall a single aircraft designer or test pilot—the real contributors to the development of aircraft—of the feminine gender.

I do not follow his assertion that it is "sheer drivel" to suppose that unfit operational pilots would be more efficient than women pilots. I would say that the comparison very much stands, for in actual fact ex-R.A.F. pilots were far more efficient in A.T.A.; they *flew* in A.T.A. Any pilot can fly in clear weather or on a well-known course, but it takes an efficient pilot to fly safely (one hundred per cent safely, that is, not "fog my foot . . etc.," type of flying) or on a course which demands perfectly accurate map-reading. Neither of these two qualities did I notice in the women pilots of A.T.A.

May I also say that being converted on to types more quickly and more frequently, relatively, than ex-R.A.F. pilots is no criterion for efficient ferrying, and that the women's casualties did not include flights abandoned for weather reasons—a plain lack of efficiency. The *absence* of this lack was most marked in ex-R.A.F. pilots and denoted the advantage of real flying experience. I do say that the women pilots were equal in pluck, but not in efficiency.

"Aetheris Auidi" would have been wiser to have gained a little more varied flying experience than just instructing—as he claims—before laying down the law on comparable ferrying.

F. S. SYMONDSON.

[*We agree with our correspondent when he fails to recall any feminine test pilot, but has he forgotten the part which Mrs. F G. Miles played in the design of some of the Miles types? She once had some difficulty in getting admission to the R.A.E. for a design conference. That august establishment had not then heard of her!*—ED.]

FLYING BOATS

U.S. Coast Guards Operating in Open Sea

YOUR issue of October 9th containing Captain Brice's remarks on flying boats reached here just before the news of the *Sky Queen's* landing in the Atlantic, and I have just seen your editorial of October 23rd concerning the *Sky Queen* and would like to make the following comments.

One of the surprising features of that open ocean landing is that so many people appear to have been surprised about it. Since the time, somewhere around 1920 (when Commander Rogers of the U.S. Navy safely sat his flying boat down in an "impossible" sea off Hawaii and rode it out for several days) until the present time, there have been innumerable cases of successful flying-boat descents in all kinds of open-sea conditions up to heavy gales. During the late war there were large numbers of unpublicized cases, and even the PB2Y3 (Coronado), which has not very good hull characteristics, has an excellent record in that respect. The U.S. Coast Guard has a long, almost completely unpublicized, record of regular work in open and rough seas, where they not only get down safely but, more often than not, take off again as part of their regular job of work; yet for commercial flying boats it is hardly to be expected of them that they should do more than come down safely and ride out safely.

In fact, it is fair to state that probably most failures to land a well-designed boat safely in a rough sea are due to defects in piloting technique; even expert pilots of boats who also fly plenty of landplanes, are liable to apply landplane technique when having to sit a boat down in a hurry. That is to say, they pay too much attention to wind rather than to sea conditions. This is a fairly easy error to make because emergency techniques are not always easy to remember on the rare occasions when emergencies occur. However, when the commercial use of flying boats increases (as it is bound to do with the increasing airport problems), these techniques will become matters of more common knowledge, training and experience.

For lateral stability on a rough sea sponsons are normally far superior to wing-tip floats, particularly as the pilot has not to consider manœuvring but is merely required to keep head-on to the sea. However, for future high-performance flying boats, the sponson is practically ruled out on aerodynamic grounds. There will, however, be no difficulty in ensuring against capsizing at no serious weight or drag penalty.

If the *Sky Queen* had been a modern and extremely expensive boat, and if it had had behind it the organization of a proper airline, there is no doubt that it could have been kept afloat until conditions arose where it could either have taken off again or been towed to port. This is an important salvage consideration which a landplane can never hope for, even on land. For, incidentally, whilst on the subject of salvage, we have the frequent cases of flying boats which have come down on land with far less damage than a landplane would have to suffer under similar circumstances, and even cases where a forced-landed boat has taken off land on its beaching gear.

It is true that, in these days, too much attention must not be given to ditching possibilities, for we know that thousands of landplane ocean crossings have been made with few ditchings. However, as our landplanes get faster and heavier, there are fewer airports which they can use; consequently, alternate airports, which they must reach to avoid crashing, get scarcer and scarcer and thus farther and farther apart, and payload must be sacrificed to provide the reserve fuel to reach them. The *Sky Queen* merely showed that a flying boat can go to the opposite extreme and still get by.

The appreciation of the possibility of flying boats is still rather slow in reaching the aviation public's mind, but we are now rapidly getting to the point where it is being realized that the money for indefinite land-airport expansion, or even for maintaining war-built airports, especially outside the richer countries, is rapidly coming to an end, and we shall have to use aircraft from the infinitely cheaper water airports which can be found almost everywhere, but which can be built as easily as land airports where they cannot be found.

Seattle, Wash. F. T. COURTNEY.

[*Captain Frank Courtney is one of the oldest British pilots, and his experience includes flying boats. Twenty years ago he even made an attempt to fly the Atlantic in a Dornier Wal powered by two Napier Lion engines, but had to come down at Corunna. His views on flying boats should not be lightly dismissed by the younger generation.*—ED.]

FLYING-BOAT BASES

Many Exist in Commercially Useful Places

CAPTAIN DAVID BRICE has in recent weeks written several articles and letters attacking the flying boat. He complains that he has received no considered and serious replies. Capt. Brice must not suppose that this is because those who support the flying boat are unable to refute his arguments. On the contrary, we find his opinions frivolous and quite inaccurate.

As I think Capt. Brice is aware, employees of the Corporations are not permitted to engage in controversy of this type. Were this not the case, several articles would have already reached you giving the other side of the picture. If Capt. Brice is serious in wishing to be convinced of the usefulness of marine aircraft, I would suggest that he endeavours to obtain the permission of the authorities for a reply to his arguments to be printed in the Press.

In the meantime I must content myself with pointing out that at least 40 bases suitable for the largest flying boats exist in commercially useful places, compared with perhaps half a dozen land airfields suitable for the 120-tonners. As to artificial bases, Capt. Brice seems surprisingly ill-informed. An artificial waterdrome has recently been constructed in Alexandria, and one was built at Rome before the war. However, it must be remembered than an artificial lake, of which scores exist throughout the world, can usually be used as a waterdrome. The cost of construction, which is in any case lower than that of a comparable airfield, can usually be written-off against the value of the lake for irrigation, water supply and recreational purposes. An excellent example is Vaaldam, the South African Marine Terminal. This contains runs up to seven miles in all directions, and was constructed for about £4,000,000, all of which was chargeable to the Agriculture and Irrigation Department of South Africa.

AIR TRANSPORT CAPTAIN.

THE NAVY'S FASTEST: With its speed of about 590 m.p.h. the Supermarine Attacker is the fastest naval aircraft. It has already been test-flown from a carrier's deck. The new Hawker N.7/46—likewise a deck-landing machine and similarly powered by a Rolls-Royce Nene—is likely to prove even faster.

SERVICE AVIATION

Royal Air Force and Naval Aviation News and Announcements

Air Council's Congratulations

THE Secretary of State for Air, the Rt. Hon. Arthur Henderson, sent the following message to H.R.H. the Princess Elizabeth and H.R.H. the Duke of Edinburgh at Buckingham Palace on the morning of November 20th:—

"On this happy occasion I beg to offer on behalf of the Air Council and all ranks of the Royal Air Force and the Women's Auxiliary Air Force sincere good wishes for your future happiness.—(Arthur Henderson)."

Appointments

COMMANDING Officer of Air Traffic Headquarters at Uxbridge since July, 1946, and head of the Joint Air Control Board until a few months ago, Air Commodore H. L. Patch, C.B.E., will take up an appointment at the Air Ministry as Director of Operational Training on December 15th. Air Commodore Patch takes a keen interest in service sport and is the chairman of the R.A.F. Boxing Association.

The appointment is also announced of Air Vice-Marshal Robert Stewart Blucke, C.B., C.B.E., D.S.O., A.F.C., as Air Officer in Charge of Administration, Technical Training Command, with effect from December 1, 1947.

Air Vice-Marshal Blucke was appointed Senior Air Staff Officer at Air Headquarters, India, in December, 1946, and since India and Pakistan became separate Dominions he has held a similar post at Air Headquarters, New Delhi, under the Deputy Supreme Commander (Air), who became Air Officer Commanding all R.A.F. units remaining in India and Pakistan until their withdrawal.

Before going to India Air Vice-Marshal Blucke was Air Officer Commanding No. 1 Group, Bomber Command, from February, 1945, and he was previously at Ludford Magna, Lincolnshire, commanding the R.A.F. Station there from June, 1943, until he was given command of No. 14 Base which was formed there in January, 1944. He commanded the bomber station at Holme, Yorkshire, from June, 1942, until he went to Ludford Magna. At the outbreak of war he was serving with the Blind Approach Training and Development Unit, which he subsequently commanded and which in 1940 was used to investigate the "Knickebein" system used by the Germans to direct their bomber aircraft to targets in the United Kingdom.

Palestine Clasp

TROOPS, airmen and seamen who have served in Palestine or in the adjoining waters since September 27th, 1945, will be entitled to wear the General Service Medal with a special clasp.

March-Past in Berlin

TO mark the occasion of the Royal wedding, over 1,000 British troops, including 150 R.A.F. and R.A.F. Regiment, marched past a saluting base in Grunewald Strasse, Berlin, close to the El Alamein Memorial, where the Commander-in-Chief, General Sir Brian Robertson, took the salute.

The parade was afterwards inspected by the C.-in-C., the G.O.C., British Troops, Berlin (Maj.-Gen. Herbert), the Head of the Air Division (A. Cdre. R. N. Waite), and other senior officers.

Air Marshal Pirie Leaves Singapore

HAVING relinquished his appointment as C.-in-C. Air Command Far East, Air Marshal Sir George Pirie left Changi, Singapore, for the U.K. on November 18th in the Lancastrian which brought to Singapore his successor, Air Marshal Sir Hugh P. Lloyd.

On the airfield to see him leave were Air Marshal and Lady Lloyd, General Sir Neil and Lady Ritchie, and Rear

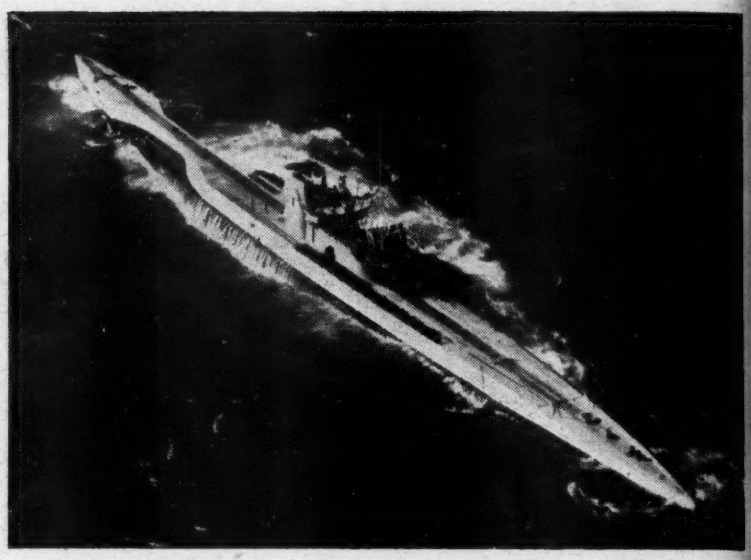
Service Aviation . . . . .

Admiral J. Egerton, A.V-M. J. Whitworth Jones, A.V-M. and Mrs. F. F. Inglis and A.V-M. and Mrs. A. C. Sanderson. After bidding his farewells Air Marshal Pirie, accompanied by A.V-M. Whitworth Jones and G/C. Cator, O.C. R.A.F. Station, Changi, inspected a guard of honour commanded by F/L. J. D. Duncan. As the Lancastrian prepared to take off six Spitfires of Nos. 28 and 60 Squadrons took up formation to escort it from Changi.

Air Marshal Pirie has served in the Far East since June, 1945, first as Deputy Allied Air C.-in-C. under Air Chief Marshal Sir Keith Park and since April, 1946, as C.-in-C. During that time he devoted himself to adapting the Air Force in the Far East to its new peace time commitments. He has made numerous visits to Air Force units in Ceylon, Burma, Hong Kong and Malaya and since January this year he has made comprehensive tours embracing Japan, Manila and Australia. He has taken a keen interest in the welfare of all ranks and married families under his command and has effected many improvements in overseas service conditions.

Australian Naval Air Unit

DURING the next five years the Australian Government will spend £24,000 in developing Australia's first naval air unit. In November the Royal Australian Navy will start training 49 artificers and non-flying technicians. In December, 15 rating pilots between 17 and 20 years of age and, in January next, 80 officer pilots, aged between 22 and 26, will start training for the fleet air arm. These 80 men are being chosen from among those who flew in the Royal Australian Air Force during the war.



CANADIAN CAN OPENING: The U-190 after Fireflies of the R.C.A.F. had ripped open her hull below the waterline with R.P.s. The exercise was held on Trafalgar Day.

Squash

HALF an hour before he was due to play a match in the R.A.F. squash rackets championship at Lansdowne Club on November 24th, W/C. P. G. Jameson was in Brussels. An aircraft was placed at his disposal by the Belgian Air Force and he arrived at Hendon only an hour late. He was unsuccessful in his match, being beaten by W/C. G. Edmonds, 7-9, 9-6, 8-10, 9-2, 9-2. G/C. S. R. Ubee reached the second round having beaten F/L. A. E. C. Wheeler, 9-5, 9-6, 10-8.

HOODED INTERCEPTER: Aircraftman Terence O'Reilly, whose hobby is falconry, with one of his charges at Shawbury. Reference to the use of falcons for dealing with the bird menace on airfields was made in "Flight" last week.

R.A.F. v. Army Boxing

AN R.A.F. versus Army boxing tournament held in Luneburg, Germany, on November 14th, ended in a draw, each Service winning five fights. The most spectacular bout of the evening was a middle-weight contest between L.A.C. Lowden, R.A.F. (London Clubs Champion 1945-46) and Trooper Patterson, 2nd Royal Tank Regiment (B.A.O.R. finalist 1946-47). In the first round Lowden caught Patterson off his balance and knocked him out of the ring. Patterson fell on his head and the referee stopped the fight, declaring Lowden the winner.

A crowd of 2,500 watched the tournament, held in a hangar, and one of the attractions was a four-round exhibition by Max Schmeling, World Heavyweight Champion of 1936. Trophies were presented to the contestants by the C.O. at Luneburg, G/C. Walker.

Officers for the A.T.C.

RELEASED R.A.F. officers and serving officers of the Auxiliary Air Force, the Royal Air Force Volunteer Reserve and the Reserve of Air Force Officers, may now volunteer for commissions in the Training Branch of the Royal Air Force Volunteer Reserve for duty with the Air Training Corps where this will not interfere with existing obligations. They will be eligible for enhanced rank on entry, or accelerated promotion. In addition, ex-officers of the naval or military forces may also be considered on a similar basis for commissions in the Training Branch provided Admiralty or War Office consent is obtained. Under this scheme, those holding the rank of flying officer or above, or equivalent rank, during present or previous service, will be entered as flying officers, and those holding the rank of pilot officer, or equivalent rank, will be entered as pilot officers. In the latter case previous service as pilot officer will be counted towards the three years' service required to qualify for promotion to flying officer in the Training Branch. In the case of ex-officers of the naval or military forces, however, a special recommendation will be required before they can be entered as flying officers or be allowed to count previous service towards that rank.

Former R.A.F. officers and others wishing to volunteer for service with the A.T.C. should apply to the C.O. of their local A.T.C. squadron, the address of which can usually be obtained from the local Town Hall, or failing this, they should write to Reserve Command H.Q., R.A.F., White Waltham, Near Maidenhead, Berks.